Special Behind The Scenes Look at Making Star Trek Special FX

NewTekniques

December 1999
www.newtekniques.com

SPECIAL STAR TREK ISSUE

[redacted]

PLUS:

A FREE AUTOMATED TARGETING PLUG-IN FOR LIGHTWAVE 3D

U.S. $6.95 CAN $9.95

AN ADVANSTAR PUBLICATION

Dream. **Create**. Astound

*M*uscles flex. Gears turn.
Wires wrap. Cloth flows.
And, just as you imagined...

...she dances.

Beyond Bones: Muscles and Muscle Chains allow you to add power flexing and subtle nuances with ease.

Complete Control: Automate movement through Expressions with very little mathematics. The extensive function library makes it possible.

Fast Flowing: With realtime interactive Softbody Dynamics, move the mouse and watch the cloth flow.*

It's almost frightening the way **messiah**™ can bring your dreams to life. Yet, you'll find yourself drawn to the sheer speed of its interactivity*, and captivated by its elegant, uncluttered interface. Created in a most demanding Hollywood visual effects studio, **messiah** is truly a unique mixture of simplicity and power.

From hybrid IK/FK to interactive skeleton setup to fast expressions*, **messiah** has the power features that you've always dreamed of, along with many you didn't know you needed.

Hierarchical effect layering, realtime interactive softbody dynamics, MotionClips™, the list goes on and on. And, it's all within your reach. Just waiting to make dreams come to life.

Are ***you*** *a dreamer?*

Project:
messiah™
1.5
Advanced Animation System

STATION X STUDIOS

Station X Studios, LLC
www.stationxstudios.com
© 2000 Station X Studios, LLC. All rights reserved.
Project:messiah and MotionClips are trademarks of Station X Studios.
**As with all animation programs, speed depends on your system configuration, model density, and scene complexity.*

Web # 301

NewTekNIQUES

CONTENTS

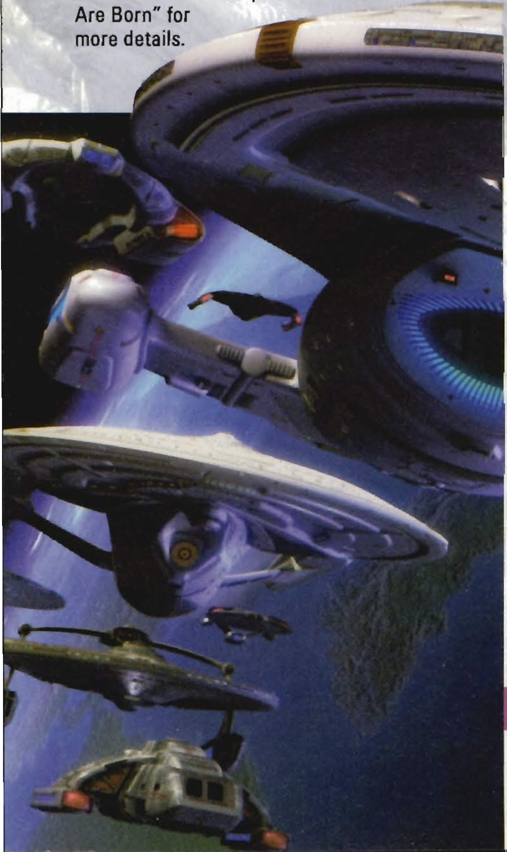
Vol. 3, No. 6, December 1999
www.newtekniques.com

8968507

LIGHT WAVES MAKE SMOOTH VOYAGE
by Dick De Jong and Molly Dinkins
Page 6

WARPING LIGHTWAVE INTO THE FUTURE
by David Stipes
Page 25

ON THE COVER: This issue's cover, featuring many of the LightWave modeled Federation starships, was created by Bruce Branit at Digital Muse. See "Where Starships Are Born" for more details.



COLUMNS

First Words: To Boldly Go... Editors Log 3
by dhomas trenn

Visions: A Three Goal Mission 4
by Tim Jenison

Plugged In: When Just Having The Weapon Isn't Enough 12
by Bob Hood

Toast Master: Beam Me Up, Bohus! Star Trek Special FX For Your Toaster............. 26
by Bohuš Blahut

Flying High: A Blast From The Past Star Trek Special FX For Your Flyer 30
by Bohuš Blahut

Mojo: Never Say Never..................... 48
by Mojo

THE MAKING OF...

Dark Frontier......................... 14
Christmas is Futile
by Mojo, John M. Teska, Dan Ritchie, and Koji Kuramura

Thirty Days........................... 36
Down Deep in the Ocean Planet
by Dick De Jong and Molly Dinkins

Timeless............................. 37
...and a Bag of Baking Soda
by Robert Bonchune

What You Leave Behind............. 42
Left Behind On Deep Space Nine: A LightWave Model
by Dick De Jong and Molly Dinkins

TUTORIALS

Star Trek Techniques For LightWave 20
by Mojo

Where Starships Are Born..................... 22
by John Gross

Lighting: Federation Style 24
by Aristomenis Tsirbas

OPENING DECEMBER 31!

NewTekNIQUES online

CONTENTS

www.newtekniques.com/bonus

8968507

COLUMNS

LightWave Fundamentals: DISCovering More Useful Tools In Modeler - Okay, there you are in your trusty little spaceship, hurtling through space, reading the official Star-farers Guide To Objects That You May See Out Your Viewport While Passing Through Charted Space. Suddenly, your ship's computer starts to make loud and obnoxious noises, telling you that you're about to slam smack dab into a... Join Jared Brookes in another LightWave tutorial adventure, and find out just what it is you've stumbled upon.

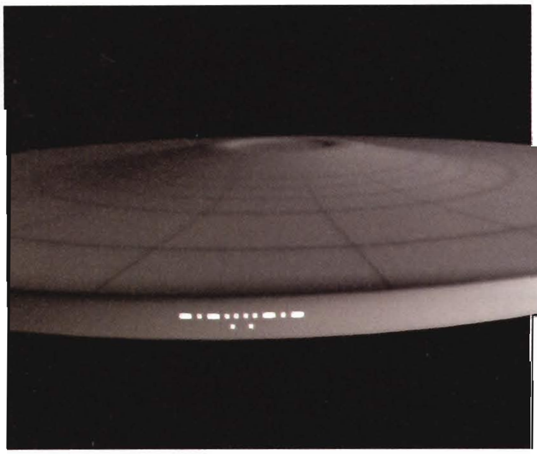


Image Effects: Beam Them Over, Cecilia -- That wacky Cecilia is back with another ImageFX adventure. She's taking you back to Scotland again. It seems she's gotten it into her head that the sheep in the Isle of Skye would be much better off in Galloway. It's too long a walk, so she's come up with a better way to herd the little rascals... using a teleporter. Don't worry! No sheep were harmed in the making of this tutorial.

Silicon Alchemy: Through The Silicon-Crystal Ball - Dave Haynie ponders where media computing is likely to go in the forseeable future, and beyond.

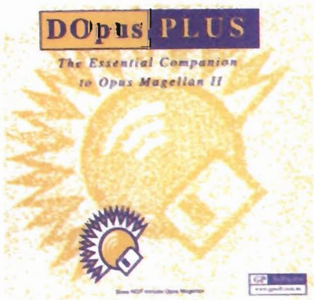
Business Matters: About All That Money... Part 2 - There's a lot more to making money than filling your wallet. Kevin Hanley shares ideas on basic taxes and ways of charting your company's performance throughout the year.

The Idea Factory: How To Make Training Videos Fun! - Who says that a small production company can't produce videos for large international companies? Not Bob Ketchum! Who says you can't have fun making training videos? Not Bob Ketchum! Join Bob, as he teaches you how to do both, behind the scenes in the making of BaxTrek: The Dilithium Incident.

The Producers' Lounge: Internet Film Festivals - Kermit Woodall surveys internet based film and video websites oriented towards displaying and broadcasting original, and sometimes strange, video!

REVIEWS

DOpus PLUS: The essential companion for Opus Magellan II (Amiga/DOpus).



Multicam Editor

Multicam Editor: Multiple camera synchronization and editing tools (Amiga/Flyer).

Short Cuts: High-speed editing and recording tools (Amiga/Flyer).

NewTekniques

VOLUME 3 • NUMBER 6 • Published by ADVANSTAR Communications
www.newtekniques.com

EDITOR-IN-CHIEF	DHOMAS TRENN DHOMAS@YOUNGMONKEY.CA
FEATURE EDITORS	DICK DE JONG, MOLLY DINKINS
COLUMNISTS	BOB HOOD, BOHUS BLAHUT, GREG NELSON, MOJO, TIM JENISON
ONLINE	BOB KETCHUM, CECILIA, DAVE HAYNIE, JARED BROOKES, KERMIT WOODALL, KEVIN HANLEY
ART DIRECTOR	MICHAEL VIGGIANO
GROUP PUBLISHER	GENE PRITCHARD
EDITORIAL DIRECTOR	KEN MCGORRY
PRODUCTION MANAGER	MARIA KRISTINA ADAMEK

NEWTEKNIQUES
201 E. SANDPOINTE AVENUE, SUITE 600
SANTA ANA, CA, 92707, USA
TEL: 714-513-8400 FAX: 714-513-8612

ADVERTISING SERVICES

WESTERN REGIONAL ACCOUNT MANAGER	KRISTINA PANTER 714-513-8458
EASTERN REGIONAL ACCOUNT MANAGER	LEA RAMIREZ 714-513-8608
MARKETING/PROMOTIONS	MONICA MATHIS 212-951-6638

SERVICES

SUBSCRIPTIONS/CUSTOMER SERVICE	888-527-7008 or 714-513-8693 FAX: 218-723-9437
CURRENT AND BACK ISSUE ORDERS	800-598-6008 or 218-723-9180 FAX: 218-723-9146
REPRINTS	MARY CLARK 800-822-6678 FAX: 541-686-5731
INTERNATIONAL LICENSING	TAMMY LILLO 218-723-9518

CHAIRMAN & CEO	ROBERT L. KRAKOFF
VICE CHAIRMAN	JAMES M. ALIC
EXECUTIVE VP BUSINESS DEVELOPMENT	SKIP FARBER
EXECUTIVE VICE PRESIDENTS	WILLIAM J. COOKE, ALEXANDER S. DEBARR, DR. MORRIS R. LEVITT
VP FINANCE, CFO & SECRETARY	DAVID W. MONTGOMERY
VP, TREASURER, CONTROLLER	ADELE HARTWICK
VP & GENERAL COUNSEL	ERIC I. LISMAN
DIRECTOR OF OPERATIONS	MICHAEL T. WELDON
GROUP CONTROLLER	COLETTE O'DONNELL
VP INFO TECH, CALL CENTERS & TELCOM GROUPS.	DANNY PHILIPS

© 1999 by Advanstar Communications. All rights reserved. No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical including by photocopy, recording or information storage and retrieval system, without permission in writing from the publisher. Authorization to photocopy items for internal or personal use is granted by Advanstar Communications for libraries and those registered with the Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923. Phone: 978-750-8400. Fax: 978-750-4470; call for copying beyond that permitted by Sections 107 or 108 of the U.S. Copyright Law. For those not registered with the CCC, send permission request in writing to Permissions Dept., Advanstar Communications, Inc. 7500 Old Oak Blvd., Cleveland, OH 44130, or fax to (440) 891-2740.

NEWTEKNIQUES is an independent publication of Advanstar Communications. LightWave 3D, Inspire 3D, Aura, Video Toaster, and Video Toaster Flyer are registered trademarks of NewTek, Inc. Amiga is a registered trademark of Amiga International Gmbh.

Printed in the U.S.A.

FIRST WORDS

A FEW WORDS FROM OUR EDITOR-IN-CHIEF

8968507

TO BOLDLY GO...

Editor's Log

by
dhomas trenn

Something very interesting happened at this year's Emmy Awards. There were five nominations in the Outstanding Special Visual Effects For A Series category. Four nominations were for *Star Trek*, with one going to *Deep Space Nine* and three to *Voyager*. The fifth nomination was for *Total Recall 2070*.

It was definitely outstanding to see that *Star Trek* dominated the category; but also impressive was the fact that all five nominated shows made use of LightWave 3D in the creation of its special effects. So, LightWave was already a winner no matter what show got the Emmy; but, that's not quite what it was all about. So...

The Envelope, Please

And the Emmy goes to ... *Dark Frontier, Star Trek: Voyager*.

A Special Tribute

I felt that this grand accomplishment, for both the *Star Trek* and LightWave teams, deserved some special attention in NewTekniques. So, we are pleased to present this cover-to-cover tribute to *Star Trek* and LightWave 3D.

In the following pages, we'll take you behind the scenes of *Star Trek*, and into the making of this year's Emmy winning, and the three other nominated, *Star Trek* episodes.

Behind The Scenes

In doing research for this issue, I had the opportunity to take a tour of the *Star Trek: Voyager* set in Hollywood. I have to say, that the moment I drove through the gates at Paramount Pictures, the hair on my arms stood on end - and it stayed that way for most of the time I was there. It really was stunning to see everything in it's rawest form. If you ever have the chance to go - don't pass it up!

Thank Yous

My thanks to David Stipes, Dan Curry, Mojo, John Gross, Doug Drexler and all of our writers for helping me make this issue a reality. Also, a special thanks to our Art Director, Michael Viggiano, for being so patient with me and for all his extra effort. I couldn't have done it with out any of you! It's been an experience to remember.

So join me now, as NewTekniques boldly goes where it has never gone before.

Last Words...

This issue is dedicated to my brother, who is probably the reason I first saw *Star Trek* many years ago, and to all other Trekkies.

dhomas trenn

dhomas trenn, boldly going...

ONLINE CONTENT

This article has additional
Online Content
www.newtekniques.com/bonus

When you see this symbol, it means that additional content related to that article is available in the NewTekniques Online bonus area. You'll most often see this with tutorials, when it means that support files are available for download, or that a variation of the technique is discussed in an online tutorial. For other articles, it might mean that demos, programs, or other related files are available online.

TUTORIALS

General

Keyboard shortcuts, and the keystrokes required to complete them, are enclosed in square brackets. [b] or [B], for example, refers to the lowercase letter, while the uppercase alternative would appear as [shift-b].

Gadgets are referenced similarly, either bracketing the gadget itself or indicating the value the gadget should be set to.

LightWave 3D

Generally, LightWave 3D tutorial functions are referred to as seen in v5.6. Here are some tips, for using earlier versions:

- Some functions have moved, for example, Render panel options may be in the Record panel, Camera panel functions in the Render panel.

- If measurements are not accepted as described, try converting values to meters. For example 1 cm = .01 m.

- Before v5.0, texture layering was not possible. Try using just the first texture described.

- If you still can not produce an expected result, consult your manual for more details on a function, or email the authors, they can help you get through with the version you are using.

VISIONS

FROM THE PAST, FOR THE PRESENT, AND INTO THE FUTURE

SCENE EDITOR
GRAPH EDITOR
OBJECTS
BONES
LIGHTS
CAMERA
ADD
CLEAR

● 89454643947
09234792644
● 25218558485
58043579045

● 02387534054
● 07808043756
75667587870
43704745340

RESET
RENDER

by Tim Jenison

A THREE GOAL MISSION

I remember exactly where I was when *Star Trek: The Next Generation* premiered. I was at Pajaro Dunes, a retreat on the Monterey Bay, along with most of the employees of NewTek. We were there to plan the development of a brand new product, the Video Toaster. After an intense day of planning, we eagerly crowded around the TV to see "The new *Star Trek*".

While I was enraptured with the new characters and the new starship Enterprise, the video engineer inside me saw something a little strange on the screen. Though the show was obviously shot on film, certain effects and transitions had a too-smooth video look to them. Apparently, the show had been posted on video equipment using video effects, instead of optical printers and film. Hmmm. This was something new. I pointed this out to the group.

Someone said, "Wouldn't it be cool if they used a Video Toaster to make *Star Trek* someday?".

Well, the rest, as they say, is history. When the hard-core Trekkies at NewTek eventually learned that LightWave 3D was being used to replace miniature models in *Star Trek*, we threw a party.

Perhaps the happiest NewTek Trekkie was Allen Hastings. Allen was the first LightWave 3D programmer/designer. He lives and breathes 3D graphics.

Back in those early days of the Amiga Toaster, Allen told me he personally had three goals for LightWave 3D:

1. To be able to sit on a beach and animate in LightWave. (Back then, laptops weren't up to it.)
2. To win an Emmy or an Oscar.
3. To see LightWave on TV every day.

In the intervening ten years, Allen's goals have been achieved, in spades:

1. Modern laptops not only run LightWave, but do so hundreds of times faster than our old desktop Amigas. Unfortunately, Allen doesn't have time to go to the beach.

2. NewTek won two Emmy awards for the Video Toaster - and our users have won dozens of Emmys and Oscars.

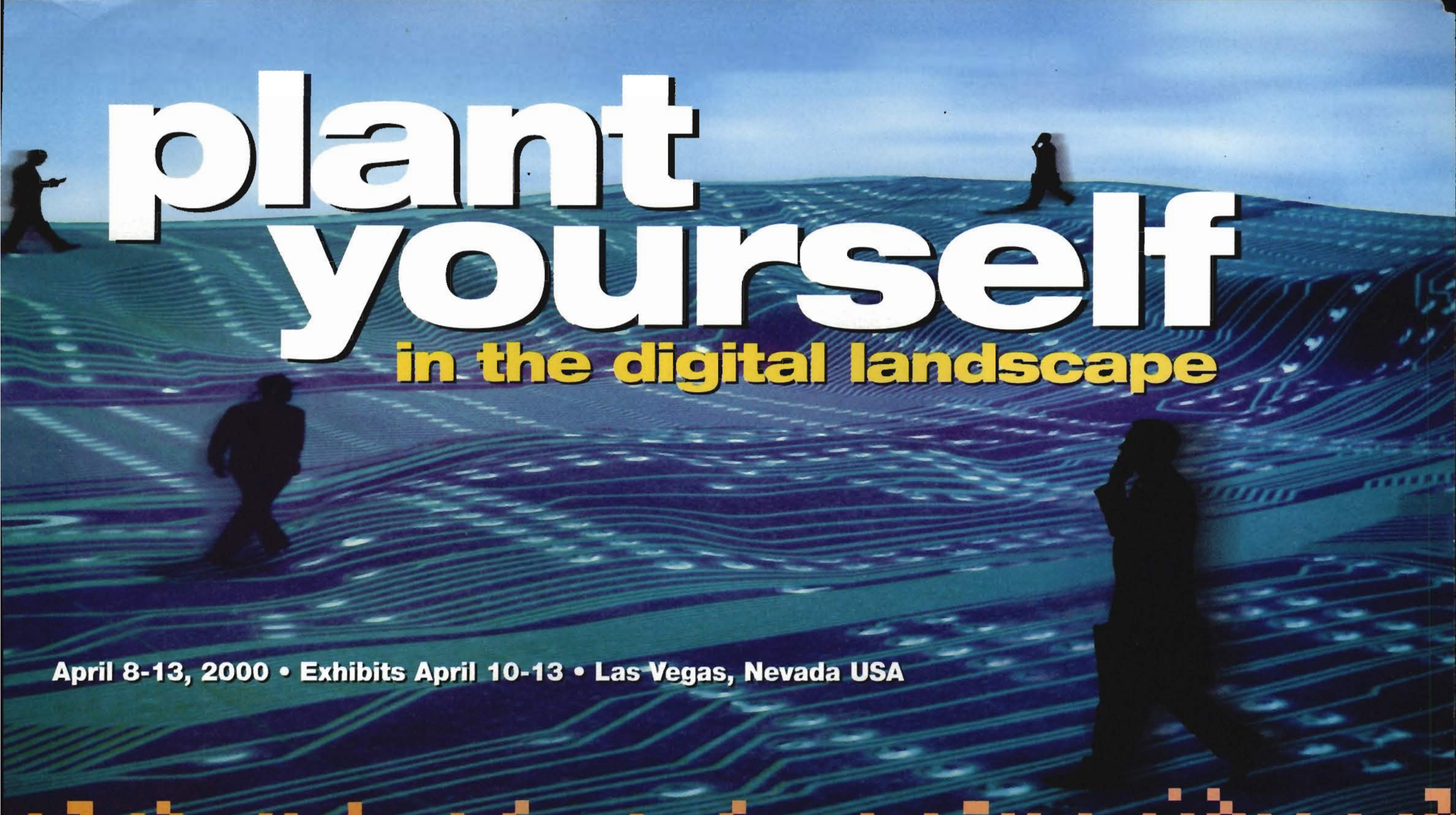
3. LightWave 3D on TV every day? How about every minute? LightWave is now the most used 3D animation package in film and video.

Today, Allen Hastings and Stuart Ferguson have been joined by a large team of programmers and are in the final stages of the ambitious LightWave [6] project.

A few minutes ago, I asked Allen if he remembered those three goals from over a decade ago. "Yeah, I remember them. They all came true." he said. "Have you got three new goals now?", I asked.

"Just one," he said. "World Domination".

Tim Jenison
Chairman & Founder - NewTek



plant yourself

in the digital landscape

April 8-13, 2000 • Exhibits April 10-13 • Las Vegas, Nevada USA

Today's technology has helped create the new digital landscape, and territory's going fast. To guarantee success in the future you have to stake your claim today — because you won't get a second chance a year from now. What tools will you need to bring with you on such an important conquest?

The technologies showcased at **NAB2000**, the single most important event for electronic media communications industry professionals. This April, we'll present every imaginable aspect of broadcast, multimedia and telecommunications, including: studio/transmission facilities, streaming technologies, video production/post production, digital television/DTV, digital radio/DAB, remote broadcasting, the Internet, satellite, wireless and more...

Multimedia/Internet

Satellite/Telecommunications

TV/Video/Film

Radio/Audio

Sumner Redstone
Viacom Chairman & CEO

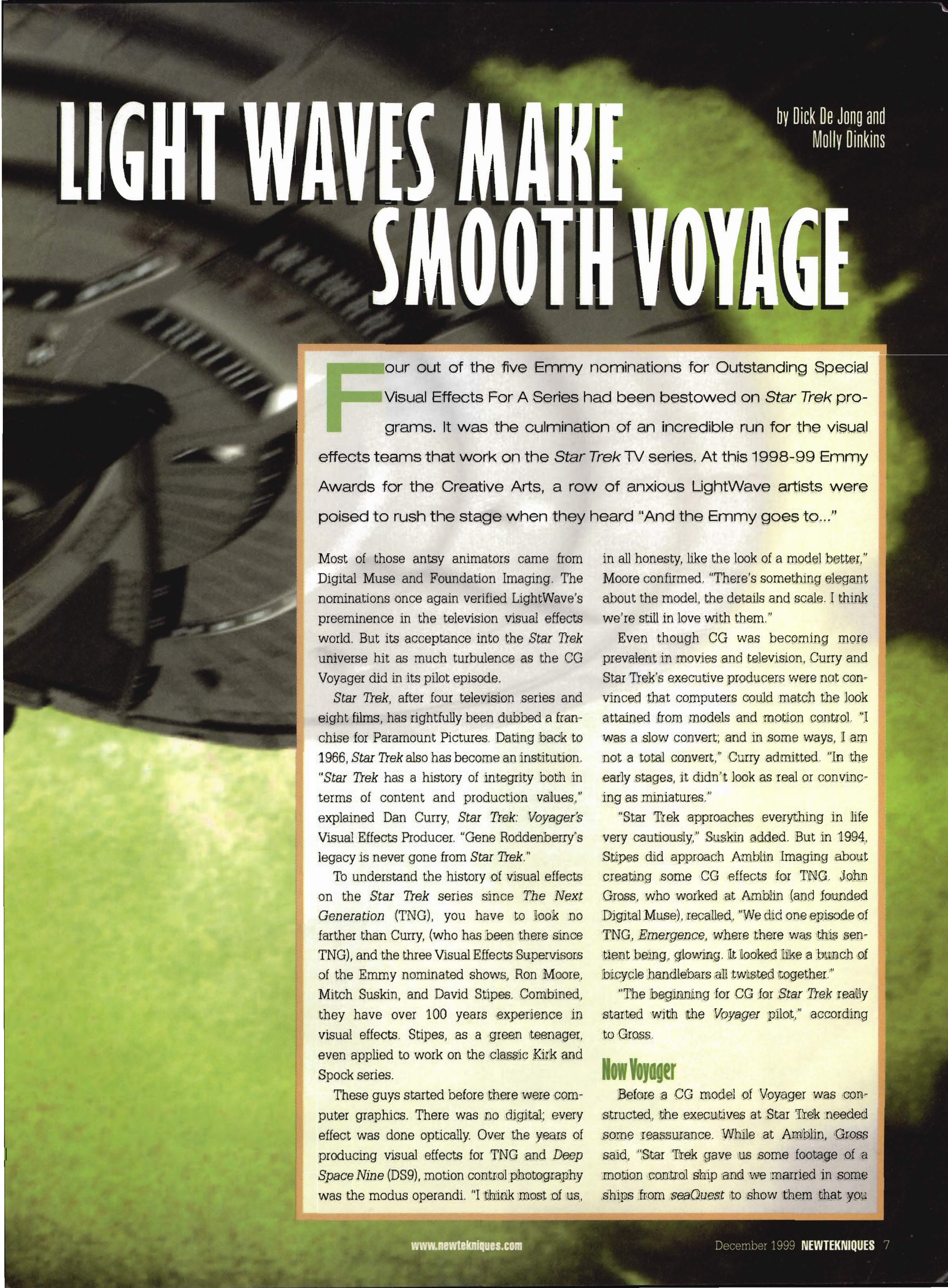
Plus, on April 10th, Sumner Redstone will deliver the keynote address at our opening ceremony. This is an opportunity to get the insight you need to position yourself and your business right on the cutting-edge of the digital landscape — straight from an industry icon responsible for creating a global media and entertainment powerhouse.

Mark your calendar and make plans to plant yourself firmly at **NAB2000** in Las Vegas this April.

NAB 2000
The Convergence Marketplace

To register, visit www.nab.org/conventions or call 800-342-2460 or 301-682-7962.

Web # 302



LIGHT WAVES MAKE SMOOTH VOYAGE

by Dick De Jong and
Molly Dinkins

Four out of the five Emmy nominations for Outstanding Special Visual Effects For A Series had been bestowed on *Star Trek* programs. It was the culmination of an incredible run for the visual effects teams that work on the *Star Trek* TV series. At this 1998-99 Emmy Awards for the Creative Arts, a row of anxious LightWave artists were poised to rush the stage when they heard "And the Emmy goes to..."

Most of those antsy animators came from Digital Muse and Foundation Imaging. The nominations once again verified LightWave's preeminence in the television visual effects world. But its acceptance into the *Star Trek* universe hit as much turbulence as the CG Voyager did in its pilot episode.

Star Trek, after four television series and eight films, has rightfully been dubbed a franchise for Paramount Pictures. Dating back to 1966, *Star Trek* also has become an institution. "*Star Trek* has a history of integrity both in terms of content and production values," explained Dan Curry, *Star Trek: Voyager's* Visual Effects Producer. "Gene Roddenberry's legacy is never gone from *Star Trek*."

To understand the history of visual effects on the *Star Trek* series since *The Next Generation* (TNG), you have to look no farther than Curry, (who has been there since TNG), and the three Visual Effects Supervisors of the Emmy nominated shows, Ron Moore, Mitch Suskin, and David Stipes. Combined, they have over 100 years experience in visual effects. Stipes, as a green teenager, even applied to work on the classic Kirk and Spock series.

These guys started before there were computer graphics. There was no digital; every effect was done optically. Over the years of producing visual effects for TNG and *Deep Space Nine* (DS9), motion control photography was the modus operandi. "I think most of us, in all honesty, like the look of a model better," Moore confirmed. "There's something elegant about the model, the details and scale. I think we're still in love with them."

Even though CG was becoming more prevalent in movies and television, Curry and Star Trek's executive producers were not convinced that computers could match the look attained from models and motion control. "I was a slow convert; and in some ways, I am not a total convert," Curry admitted. "In the early stages, it didn't look as real or convincing as miniatures."

"Star Trek approaches everything in life very cautiously," Suskin added. But in 1994, Stipes did approach Amblin Imaging about creating some CG effects for TNG. John Gross, who worked at Amblin (and founded Digital Muse), recalled, "We did one episode of TNG, *Emergence*, where there was this sentient being, glowing. It looked like a bunch of bicycle handlebars all twisted together."

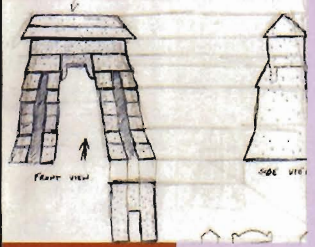
"The beginning for CG for *Star Trek* really started with the *Voyager* pilot," according to Gross.

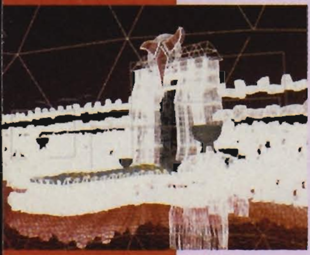
Now Voyager

Before a CG model of Voyager was constructed, the executives at Star Trek needed some reassurance. While at Amblin, Gross said, "Star Trek gave us some footage of a motion control ship and we married in some ships from *seaQuest* to show them that you

SPEAK SOFTLY AND CARRY A BIG BAT'LETH

In a dazzling CG shot, exquisitely illuminated and eerily eloquent, a coffin hurtles into space from the underbelly of the Voyager. This panoramic LightWave depiction of a cosmic military burial was nixed by Visual Effects Producer, Dan Curry, the artistic guardian of the Star Trek legacy.





"The sole reason for our shots to exist," explained Curry, "is to drive the story. If they are too grand and too self indulgent, they wind up pulling the audience out of the story. They should have the same kind of heart, the same sense of drama, and the same story-based philosophy as a shot with Captain Janeway walking on the bridge."

"LightWave is a paintbrush. It's another tool available to the creative artist to bring imagery into existence. If you present an image that's too impossible, you lose the believability of the audience."

Curry is a hands-on producer who finds inspiration in ancient cultures, far-flung locales, and even the neighborhood hardware store. "If I need something to fix a sprinkler system, I'm actually looking at those objects out of scale and out of their intended purpose. I'm grazing for spaceship parts."

"Photographs I took in Laos in the early 70's wound up being the location for a Romulan prison camp in one episode." In *Barge of the Dead*, the menacing Gates of Gre'thor were based on a peaceful photograph of Curry's wife standing in a small gate in an Irish castle.

Also, his years spent living and trekking in Asia provided much inspiration for things Klingon. "I studied martial arts intensely and spent some time in a sword school. We had an episode of *The Next Generation* where Worf was to inherit a Klingon plated weapon. The art department sent down something that vaguely looked like a pirate's cutlass. I thought, 'They're Klingons and we need to do something cool.' I made a foam core Bat'leth and worked out some martial arts movements and showed it to Rick Berman. That was the beginning of the Bat'leth and the whole sense of the Bushido-like code that the Klingons have."

No matter what you're designing, Curry concluded, "Every aspect of film making relies on the audience's imagination. You have to present images that allow the audience to complete the story with their imagination. A good artist has to respect that." "Ultimately, it's the heart of the story that matters, not the technology that brings it into existence."

can combine CG and practical in one shot."

Finally, in late 1994, Star Trek ordered a virtual Voyager. Gross explained the decision to build a CG craft, "Voyager has these wings that go up and then it jumps into warp and they couldn't do that practically." Also, there were shots in the pilot where the ship gets buffeted by a subspace tidal wave. Attempting those shots with motion control would be extremely difficult, if not impossible.

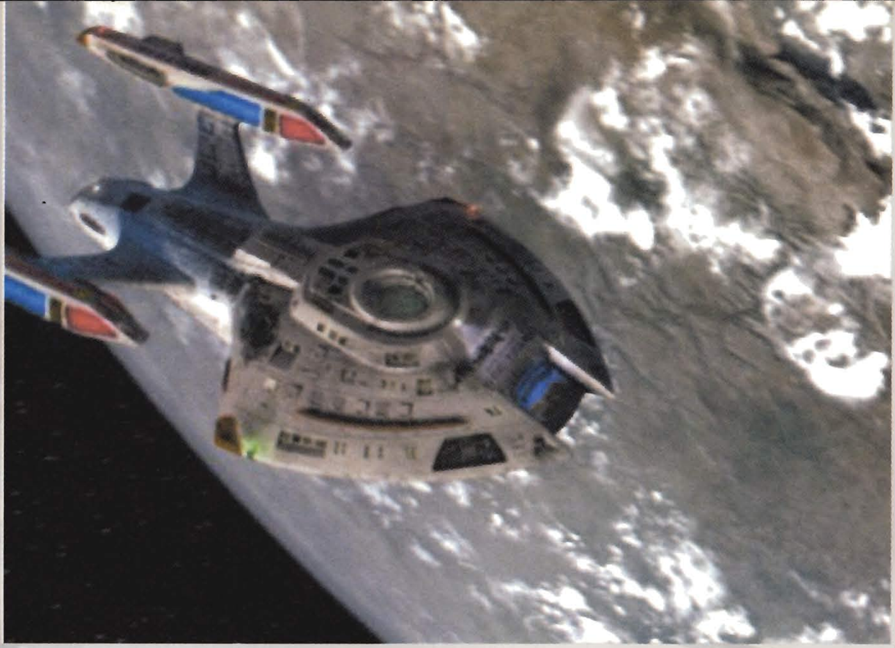
"They gave us this life-sized blueprint of the Voyager," Gross described. "The practical model is five feet long. We actually had the model scanned and it was horrible. It looked like someone had taken a giant condom and wrapped it around the Voyager. It wasn't usable so we decided to build it from scratch. At the time, it was really difficult because LightWave was going cross platform. There was a bug in Modeler, if you transferred between the SGI and Amiga versions, the surfaces would go default."

In the opening sequence of *Voyager*, you can see where the surfaces fell off on the belly of the ship. "There are darker patches on the bottom of the Voyager because it just went to the standard LightWave default surface," Gross revealed.

"Also, before the Voyager jumps into warp, the nacelles go up and it takes off," Gross added, "I called Allen [Hastings] and asked him to add a glow feature to LightWave. At one point there was a bug in LightWave. If you had glow on, every surface glowed, not just the blue parts of the nacelles. So when the wings go up and the glow starts increasing, if you look carefully, you can see that the whole Voyager is glowing. But it works. It's like 'Whoops, what can you do?'" But, hey, they won an Emmy for the pilot episode.

The Grace of Angels

Though motion control photography could produce gorgeous images, it had its shortcomings. The riggings for the camera and the model constrained the design of the shot and the movement of the model. "It is also very time consuming and once the initial program and the beauty lighting of the main pass was done, the rest of the process had the visceral excitement of watching cattle graze," Curry reminisced. "On a heavy show, we would spend 60 to 80 hour weeks - and sleep in the motion control stage - just to get the work done."



That is not the only reason that *Star Trek* went CG. When *Voyager* Supervising Producer, Peter Lauritson asked Suskin to join them on season three, Suskin explained, "Lauritson said, 'We have a little bit of a problem. We can't do motion control right now because Digital Domain has raided our motion control crew. Would you mind doing some shows in CG until we can work this out?' I was delighted to jump in."

"At first, there was a bit of resistance. No one would really endorse doing computer graphics until the huge *Deep Space Nine* episode [*Sacrifice of Angels* supervised by Stipes]. They had hundreds and hundreds of ships flying in a huge battle," Suskin continued. "It was going to take eight months to do the motion control and something on the order of $4,000,000." To do it with computer graphics, Stipes figured it could be done in a month for a fraction of the cost. The show got delivered ahead of schedule and under budget. "After that," Suskin noted, "it was very funny, in the next few production meetings, people would say, 'Now, we are going to do this with computer graphics, aren't we?'"

Added Mojo, one of Foundation Imaging's CGI Supervisors. "I think *Scorpion Parts 1 and 2* [*Voyager's* season three cliffhanger and season 4 premiere] was the big, big show where they finally decided, 'Let's see how far we can really go.' They did what was basically a feature's worth of effects for television. They're also to a point now where they're not really afraid to write anything."

Team Star Trek

"You become like an orchestra conductor where you don't necessarily play every instrument, but you have to keep the total vision of how the piece should sound and exploit the virtuosity of everybody involved in the creative process," Curry explained his role as Star Trek's Visual Effects Producer.

To create visual effects for Star Trek requires a framework of talented and dedicated artists. To maintain the Star Trek continuum necessitates an organization. "The way Star Trek works internally, the routine for a show, has been there since TNG," Mojo said. "The hierarchy has pretty much stayed the same."

The Sirius of the Star Trek sky is Executive Producer Rick Berman. Next in the chain of command is Lauritson with Curry as the Captain of the visual effects department. "Dan Curry is definitely not what you normally associate with the term 'producer'. He does not just oversee," Lombardi described. "He will sometimes take over for a section of a show. He'll do artwork and design. He's even done matte paintings for the show."

"Dan is very much the artistic vision for the show," Gross declared. To realize that vision, Curry works in tandem with his supervisors on Voyager, Moore and Suskin. "We have two teams that alternate episodes," Curry said. "It keeps everybody's life and workload within some semblance of reason."

"Each supervisor has a coordinator who works with them," Curry continued. "Chad Zimmerman, our Visual Effects Associate, deals with both teams. Then we have a number of vendor companies. Foundation Imaging and Digital Muse are our primary CG vendors; and Digital Magic is our primary compositing vendor."

"One of the functions of a visual effects supervisor is to make sure that all of the work from all of the vendors and all of the different artists is coming together in a cohesive manner," added Stipes, one of DS9's Supervisors. Concluded Suskin, "I'm responsible to the producers and the production to see that the visual effects get designed, produced, and delivered."

"How Star Trek works is that everything begins with the writers," Curry said. "They have a vision of what happens. Then we have a pre-production meeting where all the department heads get together and we discuss the problems in the show, how we're going to approach them, and what opportunities exist in the show to push the envelope."

"We determine what's going to be computer graphics, what's going to be composite, what's going to be a matte painting, and how we want to shoot our elements," Suskin explained. "We also supervise whenever there's principle photography involving a visual effects element."

"We try to work collaboratively with our vendors and animators rather than autocratically," Curry said. "I think the show benefits from that. I feel it's essential that everybody who works on it feels that they own a piece of it. In shots where the supervisor or myself might have a very specific vision of something, we'll push it until we see that. If it's really tricky, I storyboard the shots."

"The Star Trek universe has certain rules that we accept," Curry said. "If something is going to work, once it's established its own rules, then you have to obey those rules. Everybody on the show tends to keep those rules in mind, like how a warp drive works."

"We have a whole shelf up there of reference, 50 minutes of phasers, another 50 min-

utes of ships just jumping to warp, another 50 minutes of ships at warp," Lombardi added. "A lot of these things were established back in TNG when they did practical stuff."

"Star Trek is very, very picky about the way the show and the shots look," Suskin explained. "There are many subtleties that took me almost an entire season to really appreciate. Subtleties of lighting, certain camera moves. Even though we're in space, we like to have a sense of artificial gravity - that the ships don't fly upside down or sideways. There's a very specific way they like the planets to appear. Everybody who comes to this show has the same experience, that you resist it first and then you realize that it's largely responsible for the Star Trek look that's very distinctive, very high class."

Transporting to the Edit Bay

Once Digital Muse and Foundation have completed their shots, they are delivered to the edit bay at Digital Magic where they are inserted into the final show. This season, to speed the transfer and cataloging process, the studios are FTPing the elements or shots over T1 lines, rather than sending them on digiBeta.

"Sometimes we render the whole shot, but also give Ron mattes of all the elements," described Bruce Branit, one of the CGI Supervisors at Digital Muse. "In their compositing bay, they can tweak the color or the brightness of one element at a time. In the past, we would give them final shots all put together. But today, we give them every opportunity to modify a shot to whatever need might arise."

"With the FTP setup," Lombardi added, "Ron will say, 'the key light pass is a little too high up on the ship.' - and while he's saying that, I'm beginning to reanimate the shot while I'm still on the phone with him. An hour and a half later, I'll call him and say, 'Oh, by the way, it's there.'"

"With *Riddles*, we had shots of ships coming by cloaked. With the help of this pulse wave, you can kind of see them, then they fade out over time. One shot had six ships, but each ship had four different passes and they all had to be separate. Ron had to have control over every one of those elements. It was a 150 frame shot with 73 elements. They sent the composited shots to Peter who said, 'The brightness of the ship is fading out too fast.' Instead of us having to go back and change the dissolve, the shot is sent to Ron. He fixes it in the bay and it goes back to Peter all in one day."

"Here's where it all finally comes together," Moore said about the busy editing bay at Digital Magic. Visual Effects Compositor, Paul Hill, was stationed at his Inferno console in front of a bank of monitors. He was consulting with Liz Castro, Moore's Visual Effects Coordinator, about the next shot. "We have what is called a prayer book which lists each effects shot in the episode," Castro explained. "It has all the elements I need."

While talking to Rick Sternbach on the phone about ship designs for *Blink of an Eye*, Moore kept an eye on a TV near his chair. Images were being transmitted from the Henry bay down the hall, where Visual Effects Artist, Greg Rainoff was creating photonic fur flies for *Conspiracies*.

Returning his attention to the editing bay, Moore said, "We have to see the final shot here. We have books and books of different things that we can pull up and use." For example, in *Thirty Days*, the shafts of light coming down through the water were banding. "We ended up taking bursts of nitrogen that we had on a reel and held a frame. We stretched it out and created light rays. If there's a problem, it's better to have it here. I like to keep as many pieces so we can make the changes without going back to the animators."

After Moore and Suskin finish compositing their shows, the tapes are sent to the sound crew for last-minute scoring and audio effects editing. And if the stars are aligned in the sky just right, those jittery visual effects artists finally may hear the words they have been anticipating.

And the Emmy Goes To... Dark Frontier.

Since the two parter was broadcast as a two hour movie, it was submitted as a single episode. Suskin had supervised Part 1 and Moore had handled Part 2. But, Moore was also nominated for *Thirty Days* and Suskin for *Timeless*. "It's funny, each of us was so focused on our own individual show, that we kind of blocked *Dark Frontier* out of our mind," Suskin said. "When they announced the winner is *Dark Frontier, Star Trek: Voyager*, we both sat there for a minute and looked at each other and thought, Dark Frontier, Dark Frontier, what's that? Oh my gosh, that's our show!'

LightWave® [6]
THE JOY OF SIX

Allow yourself to be seduced.

Seduced by the power, the elegance and the flexibility. Your first encounter will reveal why LightWave dominates the demanding world of show business.

LightWave has always been the industry standard for exceptional realism. Today it just got better. Much better. Now, with caustics, radiosity and integrated Hypervoxels, LightWave [6] understands and delivers the nuances of lighting and volumetrics better than any other animation system on the market. The addition of a 96-bit floating-point render pipeline assures you ultimate color depth and accuracy.

LightWave [6] introduces the world's fastest and most accurate hybrid inverse/forward kinematics engine. Also, unique to LightWave [6] are IntelligEntities™. These include Endomorphs™ and Skelegons™ used to create and control character animation with efficiency and fluidity.

With the release of LightWave [6] nothing was left to chance. We completely redesigned the program and the process with you, the artist, in mind. The joy of LightWave, all the features, all the functions — better, faster, fun.

The seduction is complete.

www.newtek.com
Call **(800) 862-7837**
Outside the U.S. call (210) 370-8000

LightWave 3D is a registered trademark of NewTek, Inc. Hypervoxels, IntelligEntities, Endomorphs and Skelegons are trademarks of NewTek, Inc. © NewTek, 1999. All rights reserved.

NewTek

LightWave image created by Taron, 1999.

Web # 303

PLUGGED IN

LIGHTWAVE ADVANCEMENTS THROUGH PLUG-IN SCRIPT WRITING

A FREE Automated Targeting Plug-in for LightWave

WHEN JUST HAVING THE WEAPON ISN'T ENOUGH

by Bob Hood

This article has additional Online Content www.newtekniques.com/bonus

To look at them, you'd never guess that there were ships in the Federation's fleet that could do with an overhaul of their phaser control software. When NewTekniques heard about a particular deficiency in the fleet's weaponry system, we stepped in to remedy the situation. After all, such a problem could very well be the difference between winning or losing a battle - and we couldn't have that weighing heavy on our conscience. So, NewTekniques set out to find a better way... Bob, what do you think? Can we find a solution to this serious problem?

Fixing Those Phasers

It occurred to me that some type of set-it-and-forget-it control system would be best. But, an automated targeting system involves two separate problems. First, you need to be able to target one object to any other object. But, LightWave does not provide facilities for this; only the camera and lights can be targeted to other objects. Second, the phaser beam itself must be controlled in such a way that it is not only invisible until needed, but can also hit the target object and stay with it regardless of where it goes.

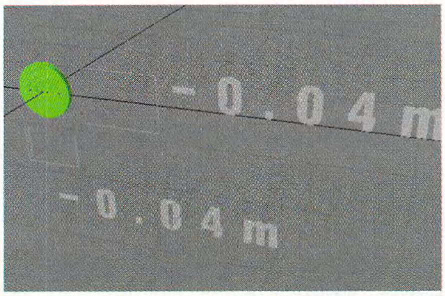


Figure 1: The Initial Phaser Beam Object

Finding a solution to this problem is not impossible. However, I'm not really a 3D guru - I don't even play one in this column. I know enough about 3D programming to make pixels chuckle with nervousness, but not cower in fear. In order to address the problem of targeting, I had to return to the basics.

Respecting Your Elders

Targeting in an unparented situation is fairly straightforward, certainly simple enough to incorporate directly into an Item Motion LScript. Unfortunately, the system that we need is nearly useless unless it can work while parented by any number of levels. In order to achieve this, there's no alternative but to resort to matrix multiplication. Matrix multiplication is at the heart and soul of 3D programming. However, it requires a lot more code than would probably be healthy in a script.

Initially, I put all of the matrix-handling code into the phaser script; but, it became clear that this wasn't the approach to take. The script had become about ten times larger than it really wanted to be; and there was a noticeable decline in speed when parenting was involved. These two things in themselves were enough to bother me. However, when I finally got the code working, I realized that the potential for this was far beyond the scope of this one script.

NOTE: The Listing 1, LScript Layout plug-ins, and the ObjectMan LScript Object Agent library referred to here are available through the Download section of this issue's online bonus area.

A Star Is Born

Thus was born the new LScript Layout targetobject() function. This function is used on line 83 of Listing 1. It incorporates all of the matrix multiplication functions needed to correctly calculate the heading, pitch and bank values; such that one object can target another. The function takes three parameters: The source object, the target object, and the time index to be used in the calculation. Notice that the output of the targetobject() function is being piped directly into the setting for the rotation values. No mess. No fuss. No bother.

Listing 1 Excerpt: The "Phaser Turret" LS/IA LScript

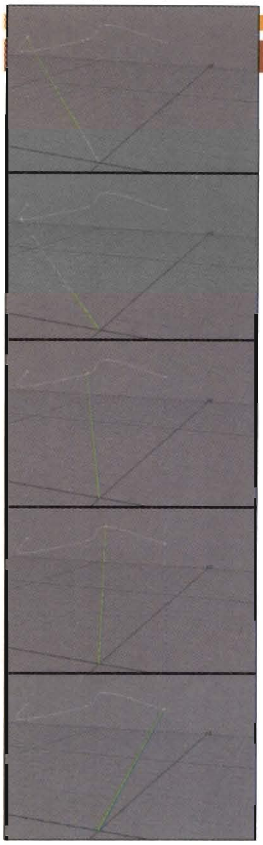
```
059:    me = motion.objID;
060:
061:    if((myobj = ObjectMan(me.filename)) == nil)
062:    {
063:    error("Cannot access object file '",me.filename,"'");
064:    return;
065:    }
066:
067:    lo_z = 0.0;
068:   hi_z = 0.0;
069:
070:    for(x = 1;x <= myobj.pointCount;x++)
071:    {
072:    v = myobj.points[x];
073:
074:    if(v.z < lo_z)
075:    lo_z = v.z;
076:    if(v.z > hi_z)
077:    hi_z = v.z;
078:    }
079:
080:    zlength = hi_z - lo_z;
081: }
082:
083: motion.set(ROTATION,targetobject(me,target,time));
084:
085:    myscl = <0,0,0>;
086:
087: if(fireBegin != nil && frame >= fireBegin && frame <= fireEnd)
088: {
089:   myscl = origScale;
090:
091:   myscl.x = xscale;
092:   myscl.y = yscale;
093:
094:   len = vmag(mypos - tpos);
095:
096:   myscl.z = len / zlength;
```

The targetobject() function will calculate rotational values based on an object's initial facing position along the positive Z axis (just as Layout does with camera and light objects). Keep this in mind when modeling objects to be used for targeting.

Extended Reasoning

With targeting firmly tucked away, we turn to the problem of managing the beam of destruction known as a phaser. The goal is not simply to make the phaser visible and then invisible between certain periods. We have to connect two points in space, maintaining that connection for an arbitrary amount of time. However, the problem is further complicated because those same two points must be allowed to move about in any direction, or be any distance from each other during that time. We have to keep them connected as though an invisible rubber band tied them together.

Figure 2: Tracking A Moving Object



Actually, with a little thought, this is not as difficult a task as it might sound. We have control over the scale of an object in our Item Motion script. A scale factor of 1.0 along any axis, is the same as setting the size of an object to its original length, width or height. This original size is that of the object when it was loaded. So, the scaling value can be thought of as a factor, or multiple, of the object's size in that particular direction. This means that, knowing the original length of the object along its Z axis, we can use that value to calculate the exact scaling factor needed to ensure that an object fills the gap between two points in space.

The object we will use for our phaser beam is shown in Figure 1. It is a simple disk object that is about 4 cm in the X and Y directions. In order to determine the object's original Z axis length, we have two choices. We can use a Displacement Map script in addition to the Item Motion script, because the Displacement Map architecture is the only plug-in type that has access to the vertex data of a loaded object. Or, alternatively, we can read and process the actual object file ourselves, keeping our overhead to a single script. I opted to take the latter course, employing the ObjectMan Object Agent to process the points in the object's file. This processing is performed on lines 59 through 80.

Once we know the original Z length of the object, we can use it to calculate the number of those individual lengths that are needed to fill in the space between the target object and us. This calculation is performed between lines 89 and 96 of Listing 1. It may not be immediately obvious, but because of the nature of the scaling values, the original Z length of the object is not a factor. Regardless of its length, the calculation performed on line 96 will make it the correct size to fill the distance.

When the phaser object in Figure 1 is not needed, we set its scaling values to zero (0). This has the effect of rendering it invisible to the camera.

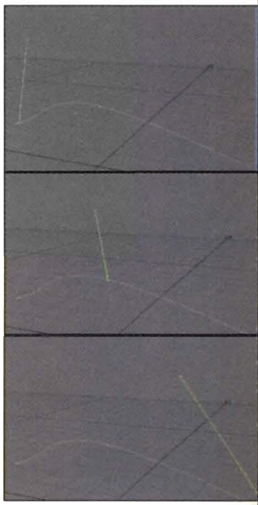
Not Your Father's Phaser

The sequence in Figure 2 illustrates both the targeting and the scaling features in operation. The beam object accurately tracks the target Null at each position, as it moves along its path.

However, the beam object is not required to sit in a stationary position. Figure 3 demonstrates the targeting mechanism when both the source and the target are in motion. In addition, we could parent the beam object to another object and it will still correctly track the target object.

With only a few simple modifications, this script can be changed (or enhanced) to fire the phaser based on the proximity of the target object, instead of using a range of time. It could also be redesigned to manage more than one target, each with different fire times or proximity distances. There are a number of possibilities yet to be explored with this system.

Figure 3: Tracking A Moving Object

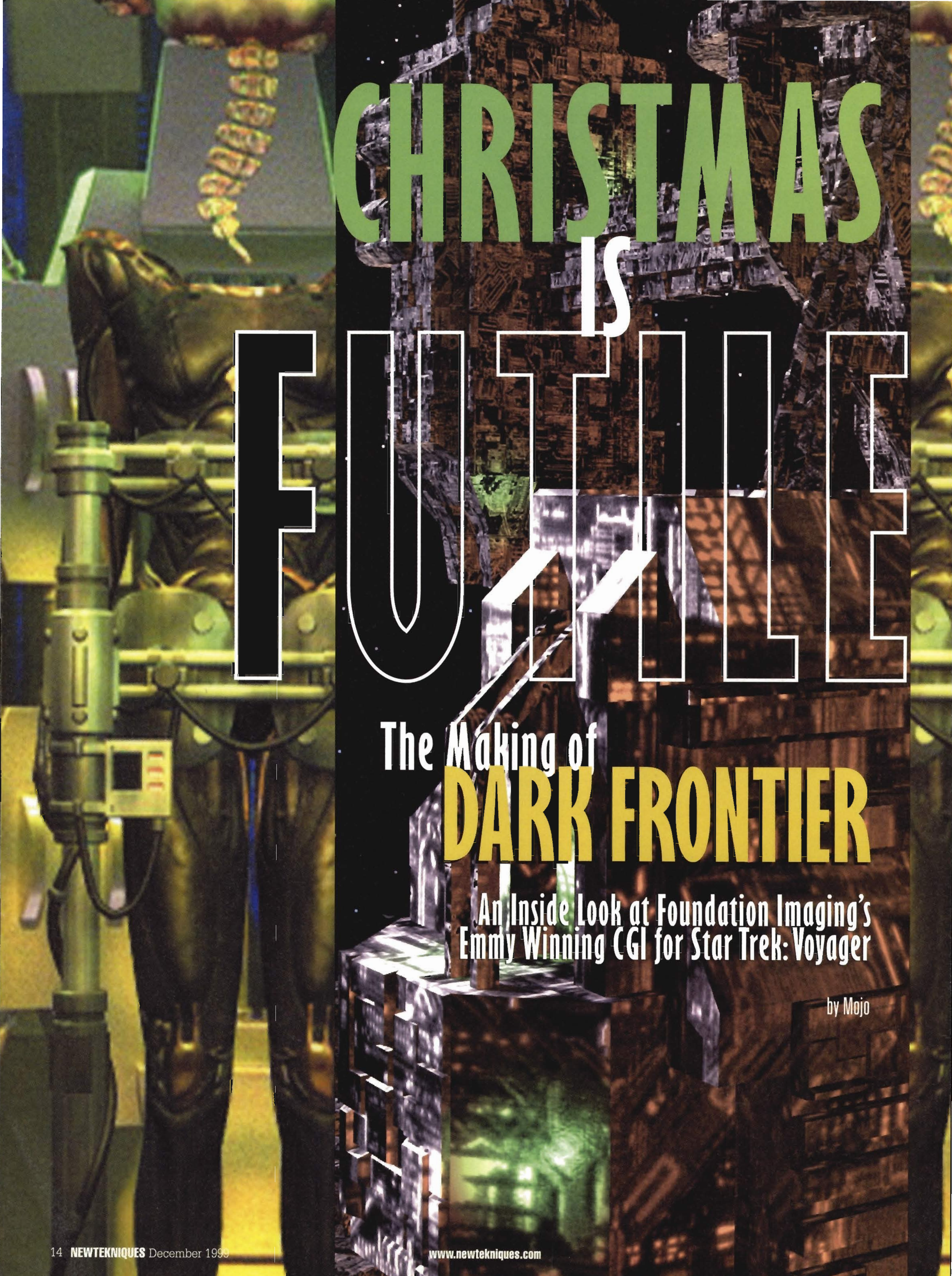


Requirements

In order to use this new targeting function you will need at least v1.4.8 of any of the LScript Layout plug-ins. The ObjectMan LScript Object Agent library is required by the script in Listing 1. These are available online.

So, go forth and target! Get out there and amaze your friends, terrify your enemies, and secure your rightful place in the universe.

Bob Hood is a Senior Software Engineer at NewTek.
You can email him at bob_hood@newtek.com



CHRISTMAS IS FUTILE

The Making of DARK FRONTIER

An Inside Look at Foundation Imaging's Emmy Winning CGI for Star Trek: Voyager

by Mojo

163 EXT. SPACE (OPTICAL) 163

The Starfield ripples and distorts... a TRANSWARP CONDUIT OPENS. The BORG SPHERE EMERGES into normal space. CAMERA PANS with the Sphere as it flies toward...

164 A BORG UNICOMPLEX (OPTICAL) 164

A vast INFRASTRUCTURE of interconnecting modules, grids, technology — a "metropolis" floating in space as far as the eye can see. Dozens of Borg Cubes and Spheres and other Geometric Shapes are flying around the perimeter. This is the sum total of Borg Perfection – a purely technological world.

This is how it all started - a few simple lines from a script by Brannon Braga and Joe Menosky, for an action-packed two-part episode of *Star Trek: Voyager* entitled *Dark Frontier*. While it may have taken the writers just a few minutes to think up and type out these visually exciting scenes, their fanciful printer strokes would translate into over four weeks of hard-core LightWave jockeying. A small team of artists in the unfashionable spiral end of Los Angeles would soon discover the meaning of the phrase, "Christmas is Futile".

Post-Production, Pre-Production

Visual Effects work usually begins in earnest a few weeks after live action photography has been completed. The first step is to read the script and make a list of shots that involve effects work. This list is provided by the Star Trek Visual Effects Supervisor, who is ultimately responsible for getting the show done.

Dark Frontier was initially a two-part episode, each part handled by different supervisors: Mitch Suskin (Paramount) and Rob Bonchune (Foundation) on Part One, and Ron Moore (Paramount) and myself on Part Two. Two teams are necessary, as trying to handle every episode of Voyager would undoubtedly result in a nervous breakdown.

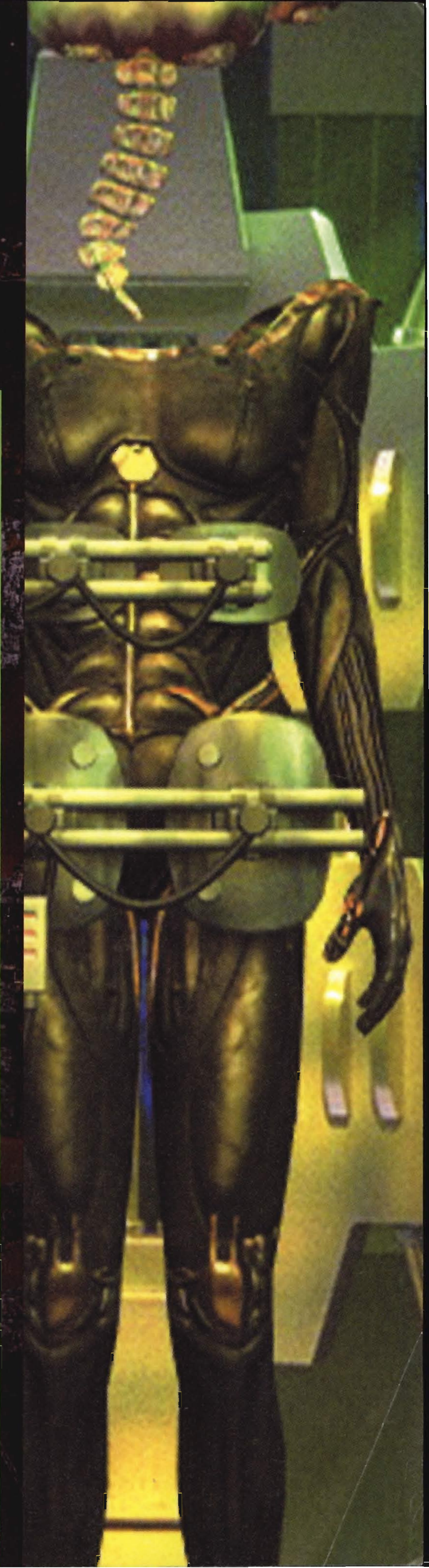
We first have to figure out what models and elements need to be created for the episode. Since many of the scenes may require new models, it is vitally important to get them built as quickly as possible. *Dark Frontier's* model list included the Borg Probe, the Borg Queen Ship and the huge Borg Unicomplex. The only element needed for multiple shots was the Transwarp Tunnel, a tube which various ships would fly through at high speed. Luckily, the producers really liked the look of the Slipstream done for *Hope and Fear*, and only asked us to slightly rework that effect for this show. Whew! One element down and 99% of the show to go.

Wired

To start the animation process, Rob or myself will create animatics to show the Star Trek supervisors - usually a wireframe or quickshade rendering of a scene using low-polygon stand-in models. Sometimes, we may actually go to the Star Trek offices with a LightWave equipped laptop, and create the wireframes with the Supervisor. Other times, the animatics will be put on video tape and reviewed.

At this point, changes to the basic design of the shots are discussed, whether to reflect the personal taste of the Supervisor or to better match the live action. Watching the filmed scenes that precede and follow an effect shot can often dictate the mood, pacing and overall feel of the action - a fast, exciting LightWave scene may be very cool, but it would be out of place if sandwiched between two somber, slower-paced live action moments.

Once everyone is satisfied that the shots reflect the action in the script, the mood of the live action, and are just really stinking cool, it's time to get down to the nitty gritty of fleshing them out as fully rendered scenes.



Mojo - Supervising VFX Animator - "The battle sequences from *Scorpion* were a lot of fun; shots of that scale are a rare pleasure."

Rob Bonchune - Supervising VFX Animator - "Working on the snow crash for *Timeless* was a definite high point."

John Teska - Director of Animation - "Bringing Species 8472 to life has been my most satisfying challenge. I've really enjoyed the fans' reaction to this character."

Koji Kuramura - VFX Modeler/Animator - "I find it bemusing to hear my daughter tell her friends that I build spaceships for *Star Trek*."

Trevor Peirce - VFX Animator - "Creating the Millennium Gate scenes from *11:59* was a unique challenge. Things that look like they could be real are always fun."

Kyle Toucher - VFX Animator - On *Dragon's Teeth* was bestowed the honor of lobbing a Plasma Missile through a skyscraper... ordinarily I'd have to join a Militia group for that."

Lee Stringer - VFX Animator - "Getting to create a space battle shot for *Dragon's Teeth*, on the same scale as *Return of the Jedi*, was great fun."

Doug Drexler - VFX Modeler/Animator - "In the past, I was a Makeup Artist and a Graphic Designer for Star Trek - and now I'm at Foundation. My third life is certainly the most exciting."

Simon Combs - VFX Modeler - "As one of the newer members of the team, I haven't done that much on the show yet."

Bob Quinn - VFX Animator - "I'm proud to be the ne west member of the Voyager team."

Take A Shot

After the animatic process, a meeting is held and the shots are divided up among the crew for that episode. Many factors go into deciding who will handle a shot - sometimes it's because an animator's particular area of expertise is called upon; sometimes it's because someone wants to try something new or challenging; and sometimes it's because they got the short straw. In any case, I try to divide the work up into sequences - groups of shots that make up a scene, as opposed to random, individual cuts. If several, closely spaced shots were animated by more than one person, the subtle differences in style from one scene to the next might actually conflict - one animator for each sequence insures better continuity.

In *Dark Frontier*, there were several key sequences: The opening skirmish between the Voyager and the Borg Probe, the Delta Flyer's covert flight through the Borg Unicomplex, the chase and destruction of the Borg Queen Ship and, last but not least, the assembly of the Borg Queen.

Now, I know what you're all thinking... with all that work disseminated, what did I do? What exactly is the job of a Supervising Animator? I wish I could say that my job is to sit around surfing the net all day and take credit for the work - but I only get to do half of that.

"Hey Mojo, Take A Look At This"

Those simple words are what led to the catch-phrase "Christmas is Futile". How so? Read on...

If you're an animator and you really, really love animating, do yourself a favor - don't become a Supervisor. I know, people think being a supervisor is a huge step up in the world, and that we get all the glory (which is sometimes true) - but it comes at a price.

As Supervisor, my job is to make sure that all the shots get done well, and on time. Of course, all the animators at Foundation do excellent work, but sometimes doing a shot right means not only being sure it looks great, but making sure it fits into the big picture of the episode. Even if a scene turns out to be the most gorgeous shot ever rendered, if it doesn't communicate the action required in the script or somehow conflicts with what came before or after it, it can't be used. This means I have to always keep careful notes on what's happening in the rest of the shots, and a close eye on the episode itself. That Borg Cube may look great, but if the lights are yellow instead of green, or if it's flying left instead of right, we'll have a redo on our hands!

So, the first part of my job is to constantly check on the progress of the animators' work and make sure it's all moving in the right direction. This being the case, hearing the words, "Hey, Mojo, come take a look at this," is no big surprise. However, being that I'm really an animator at heart, with every show I make sure I have my fair share of shots to complete as well - otherwise I'd just be some guy telling everyone else how to animate (no, I'm not ready to become a Producer yet).

Of course, having to get up every ten minutes to check on something isn't the best way to get into a good animation groove, so when you're a Supervisor, you find that you can only really work on your own shots after hours, or as the case was for Dark Frontier, which was due shortly after New Year's... well, I think you've got things figured out by now.

Unicomplex Blues

Being a Supervisor isn't all just fun and games, however! You also end up with a healthy dose of last minute problems to solve. Once rendering began in earnest, we realized that the Borg Unicomplex was the spawn of Satan. At over a million polygons, it slowed down the render stack to the Amiga 1000 days - add to the mix a bunch of 300,000 poly Borg Cubes, the Delta Flyer and a huge 24-bit background nebula, and you have a render headache on your hands! There were over a dozen such shots and the scenes simply wouldn't render. Since beefing up all the machines in the render stack to 512 MB wasn't an option, the shots themselves had to be fixed.

The obvious solution would be to split the scenes up and render the Unicomplex as a background pass, and then the other ships over the top of it as a separate foreground layer - but this would mean two passes for every shot and even more render time. If each scene were only getting rendered once, this would have been an excellent solution; however, it is not uncommon to re-render shots several times to accommodate the wishes of the *Star Trek* producers. This would mean last minute fixes would become impossible. No, the scenes themselves would have to be made more manageable.

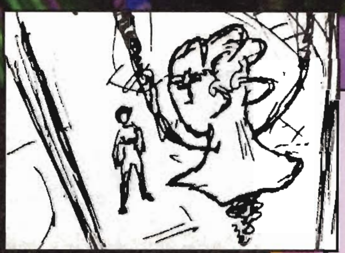
The first thing was to modify the Unicomplex on a shot by shot basis - whatever pieces of it were not seen by the camera were removed from the shot. Sections of it far off in the distance

•➤ 19

BUILDING THE BORG QUEEN

How To Get A Head In Visual Effects

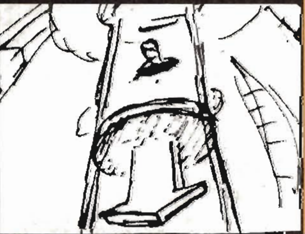
by John M. Teska



For *First Contact*, ILM had created a sequence where the Borg Queen's head appears from the ceiling and is lowered onto her torso. Hooks then latch into the flesh of her neck to secure the head. For *Dark Frontier*, the effect would be taken even further... showing her entire body being assembled - in close-up detail!

The Key To Success

Advance planning was the key to creating a convincing effect. We used story-boards created by Dan Curry, the Star Trek Visual Effects Producer and spoke with Mitch Suskin, the Star Trek Visual Effects Supervisor, about the specific shot angles and elements that would be needed. A full 3D model of the head and body parts would be used for all wide shots; with footage of the actress shot against green screen for the close-ups. In addition, the apparatus that assembles the body parts would be a 3D model that matched existing set pieces.



A Good Head For Her Shoulders

The head geometry was adapted from existing geometry. Reference photos of the actress were used as background images in Modeler to serve as a template. Also, these photos were retouched to remove shadows and highlights and used as textures. Because the photos were taken directly from the front and side of the actress, I chose to planar map the face first, then blended it with the side using an alpha map. The additional Borg detail, such as the apparatus on the back of her head, the metallic spine, and stump, were then added to match *First Contact*.

Everything In It's Place

In addition to photos of the set, I had a complete set of blueprints to build the virtual set. Since the body parts are raised out of floor hatches, I needed to accurately line up my hatches with panels that existed on set. I also had to create exact duplicates of the panels, so that I could slide them out of the way in 3D. Also, because the Queen's head is mounted on a live-action elevator, I had to exactly match the elevator's movement in the filmed plate. Finally, I used the virtual set to cast and receive shadows, to match the environment accurately. Using front projection mapping on the virtual set pieces, and the plug-in Gaffer [Worley Laboratories], I was able to do almost all of my compositing within LightWave!

Let There Be Light

On set, there were a number of green spotlights following the Queen's head, as well as a flashing strobelight. Once I determined that the strobe had an exact interval, it was easy to recreate this with a repeating envelope in LightWave. Matching this light instantly tied the CGI into the filmed plate! Then I added green spotlights in the same positions as on set and targeted them to the Queen's head (shadow mapping with soft shadows matched the set lights). A little bit of fog finalized the blend between the real and the CGI elements.

In some set shots, there was a harsh green light on the edge of the Queen's head, as well as a grid shadow moving across her face. I painted a color map that could be carefully applied over the original image to tint the edge of the head. The grid shadow was matched by applying a grid image, with a texture reference null, to the luminosity channel of the head polygon. This texture reference null was aligned with the spotlight, then the head polygon mesh was subdivided and modeled to approximate the contours of the face. When the depth of this mesh was scaled to almost zero, it appeared flat; but the texture of the grid curved across the virtual face.

Heads Up

The most critical shot was the close-up of the Queen's head hanging in the elevator. First, slight movements in the footage had to be stabilized, and a matte needed to be generated from the green screen. This footage was then mapped onto a polygon and positioned in front of the 3D neck and shoulders. A simple blending map in the transparency channel completed the illusion. Since the polygon and the geometry were parented to a common null, it was then easy to move them together.

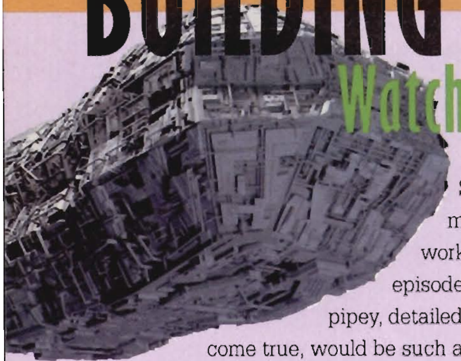
The Proof Is In The Head

Though there were many challenges in this sequence, it was proof that the best approach to a complicated shot is to break it down into a series of individual, simplistic problems.

BUILDING THE BORG PROBE

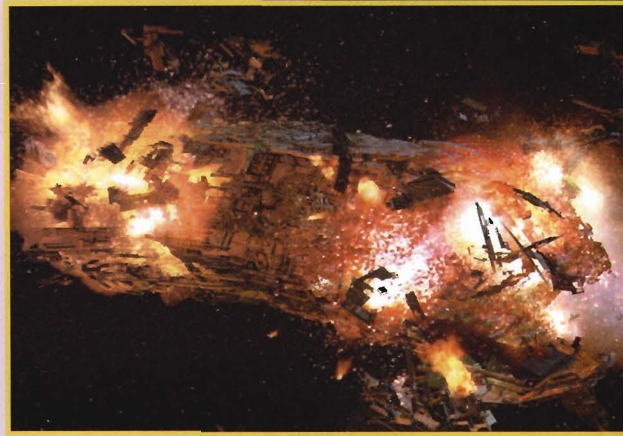
Watching Your Work Go Up In Flames

by
Dan Ritchie



Starting with a basic primitive shape, it was my job to build and ultimately destroy the Borg Probe ship for *Dark Frontier*. I had wanted to work on something Borg-like ever since seeing *The Next Generation* episode *Q Who* [in which the Borg premiered]. I have always admired the pipey, detailed look of the Borg vessels. Who would have guessed that having my wish come true, would be such an ordeal!

A Wish Becomes Reality



The vessel was created entirely in modeler, without the use of texture maps. Modeling the ship was straightforward, but was still a daunting task considering the level of Borg detail required. Also, it was our desire to avoid symmetry across the hull of the ship and to break up light and dark shaded areas, to help give it the definitive Borg feel.

Basic sections were sliced into primitives, and smooth shifted in and out to give some depth to the model. Images from *Star Trek: First Contact*, and concept sketches from previous *Star Trek* episodes, were used as reference. CGI Supervisor, Rob Bonchune, provided additional guidance for the final look of the model.

Large areas of pipes and other detail were modeled flat, using copy and paste to place them all over the basic shape - rotating and scaling the clones helped prevent the detail from appearing too generic. It was still necessary to custom model some pieces to fit the ship more precisely, such as around corners - this easily became the most time consuming part of the project! In addition, the vessel had to be modeled as 32 separate pieces (to defeat the 65,000 polygon object limit), and parented to nulls to control the motion and rotation. The finished model came in at just under 1 million polygons. [Rob's Note: The complexity of this model posed a render problem, so I ran a polygon reduction on the model, and sliced the ship up to be sure that only the parts visible to the camera were loaded into each scene.]

Gone in a Fiery Blaze

After the ship was finalized, then came the sad task of destroying it. I used a total of 14 explosion sequences mapped onto polygons, to complete the three-stage pyro effect. For debris, I dissected the 32 pieces of the model into several hundred smaller pieces and added some extra detail for the inside of the ship. All the pieces were animated by hand to match the timing of the three explosions. Yes, by hand. While plug-ins like Particle Storm are great for animating generic explosion debris, you lose a certain amount of vital control over individual pieces, during the course of the shot. In the time it takes to tweak PSM files to get the results you're after, you probably could have done the whole thing manually anyway! Lens flares and some expanding point clouds were also added to enhance the 2D pyro elements. By this point, I felt I had a somewhat reasonable explosion.

But, *Star Trek* standards are pretty high, and so Mojo stepped in to coach me on a few of the finer details of CG explosions - which he learned from working on *Babylon 5*. He felt that the size of the debris chunks in my explosion were too similar, and that more variety was needed. Rob had some input too; he wanted to see a large section of the vessel blown off all at once, and felt that the ship needed a final moment of total annihilation. The general consensus was that the scene needed to show the ship looking more like it was being torn apart, than a random collection of debris flying out of a huge fireball. After already having spent an entire weekend on the shot, this realization was something of a trauma for me - hundreds of pieces needed to be reworked. Some needed their rotation modified because of an off-center pivot point, some needed to be dissolved out as they passed through explosion polygons, and some needed their overall movement reworked to properly convey their size and mass.

It was a big job, but when the shot was completed. I realized that this insane attention to detail is what really made the shot come to life - and maybe it was worth all that extra effort! Maybe.

◄• · 16

were rendered and placed as a still on a polygon (the same went for Borg Cubes in the distance). Then I reviewed the image maps for every object in the scenes, and found a few that could be reduced either in size or in color depth; you'd be surprised how often an 8-bit map is all that's needed (in fact, it has been my personal experience that 24-bit color is rarely needed in an image map). Likewise, unless a model is getting really close to the camera, maps in excess of 1,000 pixels are largely unnecessary. I completely understand the overzealous modeler who wants to make sure every square inch of that ship looks ready for the showroom floor, but when it comes down to the wire like this episode did, does that left wing braking flap really need to be 600 by 800 pixels? In dire straights like these, the answer is definitely NO! After all these measures were implemented, the polygon and memory count was reduced enough to render the scenes in one pass (with a minimum of paging - do your best to make sure the PC's aren't forced into using virtual memory - short of an all-Steamer and Hypervoxels scene, nothing will slow down your render more).

More Fun And Games

Despite all the hoops we found ourselves jumping through to get *Dark Frontier* finished, at least we could take solace in the fact that we had two episode's worth of time to complete it in.

Or at least it started that way!

Halfway through part one, the powers-that-be decided that *Dark Frontier* was shaping up so well, that it would no longer be just a two-part episode - it was now scheduled to air as a two hour special. This meant we had to have the entire show finished on the part one schedule. Did I say Christmas was futile? It's more like trying to have any kind of life outside of *Star Trek* is futile.

Despite the pressures and headaches, however, when all was said and done *Dark Frontier* was a show that the entire *Star Trek* crew at Foundation was proud of. We completed a feature film's worth of effects shots on a television budget and (I humbly say) at nearly film quality - all for a show we grew up on. Not bad for a bunch of nerds sitting behind some desks in the unfashionable, outer spiral arm of Los Angeles.

Sherry Hitch - Supervising VFX Compositor - "Motion tracking, painting unwanted elements, and blending LightWave into live action have been my specialties."

Pam Vick - VFX Compositor - "I enjoyed creating mattes for the Borg Queen on *Dark Frontier* and *Timeless*. The people I work with make it all worthwhile."

Lindsay Adler - VFX Coordinator - "The Voyager team has so many great and talented people - I'm glad I'm there to keep them out of trouble."

Brent Burpee - Systems Engineer - "It's amazing to see the progression of sequences like the Fire Cave in *What You Leave Behind*. You get the sense you really can create worlds."

Jeremy Lang - Systems Engineer - "We build almost all of our machines, and they stack up pretty well against the big money workstations - If I do say so myself."

BUILDING THE BORG UNICOMPLEX

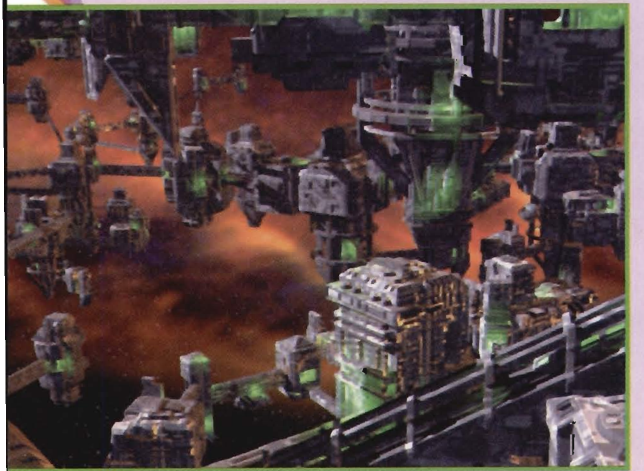
A Nice Place To Build, But I Wouldn't Want To Live There!

By
Koji Kuramura

The Borg Unicomplex, based on a wooden model built by Dan Curry, took over three weeks to build and weighed in at 1.3 million polygons!

The model was built in sections, like spokes on a bicycle wheel. Each section beginning as a module with detail and piping, and connected to other modules by tube-like conduits. Everything was constructed generically so that cloned parts could be easily used.

The Center of the Unicomplex, home of The Borg Queen's Main Chamber, began as a modified Borg Cube and was surrounded by various modules, conduits and other random geometric shapes. A massive door was built into the side so that ships could enter and exit.



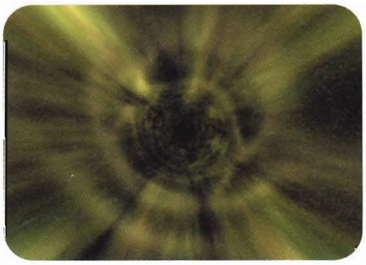
Approximately 36 modules were used to create the layered look of the Unicomplex. Texturing was mostly done use generic Borg detail textures already in existence (the central hub was the only area that needed alterations to the generic images).

The finishing touch was to add greenish/yellowish lights at key points - to give the Unicomplex that lived-in look. Point lights, placed randomly around the geometry, was all that was needed. One small problem we ran into was that the dark, nearly black color of Borg detail made it difficult to see the effect of all these tiny lights. The solution? Let's just say I'm glad that LightWave's lights go past 100%! [Mojo's note: The low diffusion nature of the Unicomplex is a key reason why the subtle nebula was placed behind it - this way, even sections that were not catching a lot of light would still be silhouetted, making at least their shapes recognizable.]

STAR TREK TECHNIQUES FOR LIGHTWAVE

by Mojo

I've learned a lot of cool stuff over the last few years of working on *Star Trek: Voyager*. Here's a few quick tips and ideas to make your space adventure a little more productive.



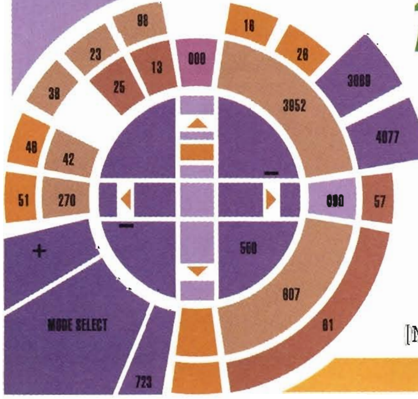
Building A Better Starfield

I still see many space-bound demo reels that haven't quite nailed the look of space. In fact, it seems like many folks out there are still using the LightWave stars that come with the program! These look okay, but they lack the varying densities needed to appear realistic. Go out and look at the night sky and you'll see what I'm talking about. Some stars are big, some are small, some are bright and some are dim. Here's a quick way to add more realism to LightWave's starfields:

1. First, load up any LightWave starfield object and [Clone] it twice. [Rotate] each one about 90 degrees apart, so they don't stack up!

2. Set the first object's Object Dissolve to 15% and give it a Particle/Line Size of 1.5 [Medium]. Object Dissolve the second object to 55%, with 1.5 [Medium] Particle/Line Size. Finally, Object Dissolve the third starfield to 65% with a Particle/Line Size of 1 [Small].

3. Add black [Fractal Noise] to the Color channel of your stars, with a Texture Size of 100 m all around. Leave the rest of the settings at their defaults.



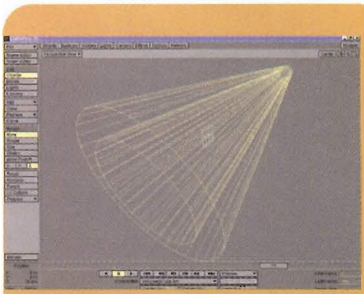
Building Slipstreams and Transwarp Tunnels

During the fourth season *Voyager* finale, *Hope and Fear*, our dauntless crew encounters a new form of high-velocity warp called the Slipstream. One of the primary effects needed for this show was the Slipstream Corridor, a sort of hyperspace tube that ships would travel through when moving at this incredible speed. Instead of the usual plug-in approaches, I opted to give the old Fractal-Noise-On-A-Tube trick a whirl. Much to my delight, the Star Trek supervisors and producers were very pleased with the effect. In fact, the Borg's Transwarp Tunnel in *Dark Frontier* was just a slightly reworked Slipstream Corridor. Here's how to build it:

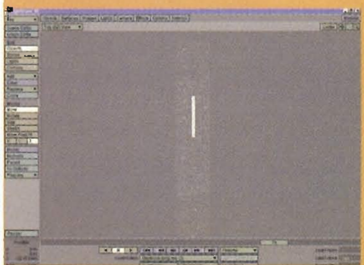
1. Start out with a 32 sided, 20 km tube. Center the tube at 0,0,0.

2. Place another slightly smaller tube inside the first. Two tubes will give a multiplaning, dimensional look to the effect.

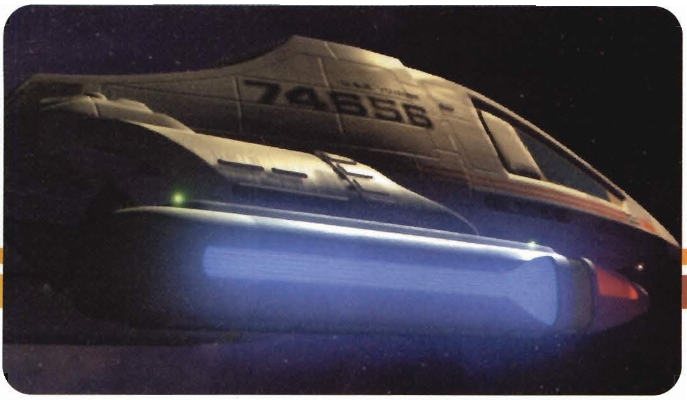
3. Surface them separately. Give the outer tube a pale, yellowish



Place a tube within a tube to build your Slipstream/Transwarp Tunnel. Make sure you remove the end caps!



Note the very large starblock moving past the tunnel. The blocks are much larger so they can use Distance Dissolve. This allows the stars to fade off in the distance at a different rate than the tube, which is fading in fog.



This shot of a Shuttlecraft has the Glow Effect set to 150%, with a Glow Radius of 96. These extreme numbers are needed to match the look established with motion control models dating back to *The Next Generation.* The render time on this frame was 1:52.

The glowing nacelle is now off-screen. With the Glow Radius still set high, the render time would be 1:18. However, with the Glow Radius enveloped to 0 it only takes 44 seconds!

Surface Color. Enable Additive and set Transparency to 80%, Luminosity at 0%. Add an [Underwater] texture to this channel as follows: Texture Opacity 100%, Texture Size 500 m / 500 m / 20 km, Texture Value 75%, Wave Sources 32, Wavelength 1000, Wave Speed 25, Band Sharpness 10. Texture Center 10 km on each axis, and Texture Velocity -150 m on Z.

4. Set the inner tube Surface Color to a sharper yellow. Enable Additive and set Transparency at 100%. Add a medium green [Fractal Noise] as follows: Texture Size 75 m / 75 m / 1 km, Texture Velocity -140 m on Z, Frequencies 32, and Contrast 0.8.

5. Inside the Transparency channel, apply [Fractal Noise] as follows: Texture Value 50%, Texture Size 100 m / 100 m / 1 km, Texture Velocity -125 on Z, Frequencies 32, and Contrast 1.

6. Add another layer of [Fractal Noise] as follows: Texture Value 100%, Texture Size 200 m / 200 m / 1.5 km, Texture Velocity -80 on Z, Frequencies 16, and Contrast 1.5.

Increasing or decreasing the texture velocity along the Z axis will change the apparent speed - if you set it high enough, you won't even have to move your models very much! I also added some zooming, streaking stars to give the illusion of more speed – and to remind us that we were still in space. To better see these stars, the final scenes had the entire tube dissolved out 25%. You can't use the hollow LightWave stars for this, so just create a long block of particles with an empty space in the middle for your tube, and just move them along the Z axis. Try cloning your star block and move it at different speeds to help add some dimension and perspective. Also, add some fog in the distance (to heighten depth) and give the camera a really wide lens (about 15 mm). This will also make the tube appear to go further into the distance, and make objects passing by the camera seem faster. I also increased the Motion Blur Length to 150%, for a more streaky look.

Captain, We Need More Power!

Until we all get 500 GHz Pentium X's, the only way scenes are going to render faster is through careful planning, being economical and, above all, cleverness. Here are a few tricks we've come up with:

1. LightWave calculates shadow maps for light sources even if they are off screen. So, let's say you've got a fleet of starships flying past the camera, and each ship has it's own shadow mapping spotlight of 1024K. Before you know it, your scene is using virtual memory, and rendering ten hours per frame.

LightWave, however, does not calculate shadow maps for lights with Intensity set at 0. So to save a lot of time, use an Envelope for Intensity that is on when an object comes into camera view, and off when it exits the frame.

2. The same concept can be applied to scenes which use the Glow Effect. The Shuttlecraft warp nacelles are notorious for needing a very large, blue glow surrounding them. When the ship gets close to the camera, Glow Radius settings of 128 are not uncommon! However, LightWave still calculates the glow even if the glowing object is not on screen! So, we Envelope this value to 0, until just before the nacelle comes into camera view (we want to be sure to catch the haze of the glow that surrounds the actual object!).

3. Don't use Hypervoxels. I am the first to admit that there are certain effects which are only achievable with this marvelous plug-in. However, I find an alarming number of animators who immediately go right to it at the mere mention of the word smoke. I honestly can't tell you how many times we've started out using Hypervoxels and, in the end, resorted to filmed elements or Fractal Noise on a polygon [Tip: increasing the Frequencies of Fractal Noise to 64, or even 128, will greatly enhance the realism of the effect, and get rid of that pesky strobing]. For the majority of complex situations, the simple solutions work best. Sure, it may be tedious and tricky to set up a stack of multiplaning fractal polygons; but the results are easy to predict, easy to adjust, don't crash the stack, and don't take forever to render. Have we ever used Hypervoxels? Of course - but only when there's no other way to get the job done. That's what plug-ins are there for - to do a job that LightWave absolutely, positively cannot do on it's own.

4. Often we're working with scenes that are very polygon intensive. This means that wireframe previews take forever, so quick, interactive scene creation is not possible. Previously, when we were doing the basics of a scene, we used low polygon versions of the models to get fast redraw times. Then when it was time for the finishing touches, we replaced the stand-in models with the real thing. But, then inspiration struck!

Now, we leave both versions of the model in the scene at all times and simply parent the full-res model to the stand-in. Then, we turn off the polygon visibility of the main model by enabling Unseen By Camera for the stand-in (if you're using a version of LightWave without this feature, reduce the Polygon Size to 0). This way, layout will only display your low polygon models, but you'll always render with your finals.

There you have it, real-life *Star Trek* tips. Use them well, use them wisely, but above all, use the manual! NT

Mojo is an Emmy awarded Supervising VFX Animator at Foundation Imaging. You can email him at mojo@foundation-i.com

WHERE STARSHIPS ARE BORN

The Digital Shipyards of Earth

by John Gross

In the world of the future, Federation starships are built at the Utopia Planetia Shipyards orbiting Mars. But here in the present, Federation starships are built mostly at Digital Muse, on Earth.

In the Beginning

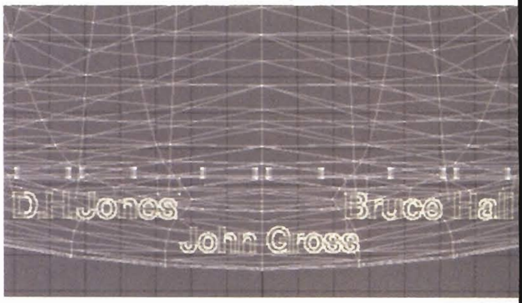
The process begins with a ship design. Depending upon the use of the ship, this could consist of anything from a quick sketch of a single view, to full-blown blueprints of all orthographic views of a ship (or anything in between). If the ship is going to be used throughout the series, like the U.S.S. Voyager, we will receive blueprints. If a ship is to be in just an episode or two, we will receive a drawing, usually consisting of a few different views. If it's a Federation starship, in most cases it is designed and sketched out by Rick Sternbach, Star Trek's main Art Designer. If it's an alien vessel, Star Trek and/or Muse will come up with designs, from which the producers choose.

If there is a physical model that already exists, then we will generally have that delivered to our studio. There was a time (during the *DS9: Sacrifice of Angels* episode) when you could walk in and see four or five different *Star Trek* models uncrated and placed throughout the space. Having the physical model to work from is extremely handy in order to take measurements and photos of textures, colors and patterns. It's also good reference to see how pieces fit together. All of the physical models have multiple mounting holes for when they are shot in a motion control studio. We built some handy wooden stands with mounting rods that take advantage of these holes to support the models at an artist's desk. This way the artist can have the model handy without having to handle it.

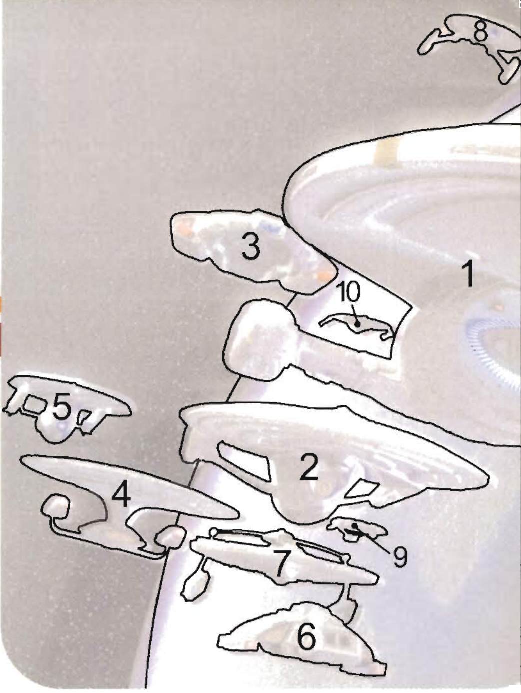
Reference Photos

Once we have any drawings and/or the physical models, the artist assigned to the task starts building it from scratch in Modeler. We realized early on that we get much cleaner and more efficient models by building them all by hand as opposed to having them scanned in. We'll often start off by taking photos of the model from all of the orthographic views with as long a lens as possible. We've been known to go up on the roof of our building and shoot a model at ground level. This way we get a shot that is as flat as possible, for use as a texture map. Sometimes, we take a shot of the texture of the ship as a reference template to paint a new version. This is the case if we have to model close-ups of the ship. Photos of the top and bottom of the ship work excellent as texture maps for stand-in versions of the ship. If you never get that close (ships far away in a fleet for instance), this option works very well.

Photos of the ship also work well as background templates in Modeler while building the ship. As the ship is being built, decisions are made as to what detail parts will be geometry and what parts will be texture mapped. The need for the ship to be close to camera is the deciding factor. Ships like the Defiant, the Runabout, and Voyager have a lot of small detail.



The artists are sure to "sign" their work, like this example from the Voyager hull.



Other ships like the Steamrunner and Sabre are mostly texture maps

Like The Real Thing

After the ship is built to match the geometry of the real ship (if one exists), we tweak the image maps and lighting until it matches the real ones exactly. We're fortunate that we have some inside help - that being Dan Curry and the Star Trek supervisors. These guys have had years of experience with physical models and know all the nuances of the ships. It's pretty easy for them to spot inaccuracies between the digital models and the physical ones. We will take reference footage of the actual ships in shots and do split screens between the practical model and the computer model until we make them match enough where no one can really tell the difference. Once they are set up, assembly scenes are created that are used to load the ships and all of their lights, etc.

Let Them Know It Was You

The final thing to remember is that if you can model, texture and light a ship so somebody can't really tell the difference between CG and reality, you've done your job. Oh, one last thing. Make sure to sign your model somewhere! Our artists will almost always put a piece of themselves into a model somewhere. Usually it's a stenciled signature (like on the back of the Voyager) that's invisible in the textured model.

Here's a quick walk thru of the ships on this issue's cover:

1. U.S.S. Voyager: As far as I know, this was the first fully CG ship. It has been used in every episode of *Voyager*. This ship was built for the pilot at Amblin Imaging by David Jones, Bruce Hall and myself during a 6-8 week period.

This was the first major model built during the time that LightWave was moving cross-platform. Parts of it were built in Amiga LightWave and parts on the SGI version. While bugs were being worked out, we had many surface loss problems when going back and forth between the two platforms. The Voyager has undergone many additions and modifications by both Digital Muse and Foundation Imaging as needed for specific episodes.

2. U.S.S Enterprise-E: Our CG version of this ship was built and textured entirely by David Lombardi. It was originally built at film resolution as a test for *Star Trek: Insurrection* and is therefore extremely detailed. For video use, we had to scale down all of the image maps (120 MB worth!) so it would render in a reasonable time. This ship was built based on drawings and photos of the practical ship, and using a store-bought model kit as reference.

3. U.S.S. Defiant: The CG version of this ship was originally built by Vision Arts for *Deep Space Nine*. But for *DS9: Sacrifice of Angels*, Muse was commissioned to rebuild it and Brian Fisher was put to the task. He later rebuilt it again for *The Valiant*, as he wasn't quite happy with his first go-round. Brian received the honors of blowing up the Defiant in one of the last episodes of *DS9*.

4. U.S.S. Enterprise-D: The CG version of this immensely cool ship was originally built by ILM for the *First Contact* movie. Muse received the geometry and converted it to LightWave, then re-textured it for *Sacrifice of Angels*.

5. U.S.S. Excelesior: Another *Sacrifice of Angels* ship. This one was also modeled and textured by David Lombardi using both a practical two-foot model and a store-bought model kit as reference.

6. The Runabout: The CG version of this ship was built and textured by Brian Fisher for *Deep Space Nine*. We had both a two-foot practical model and a store-bought model kit for reference.

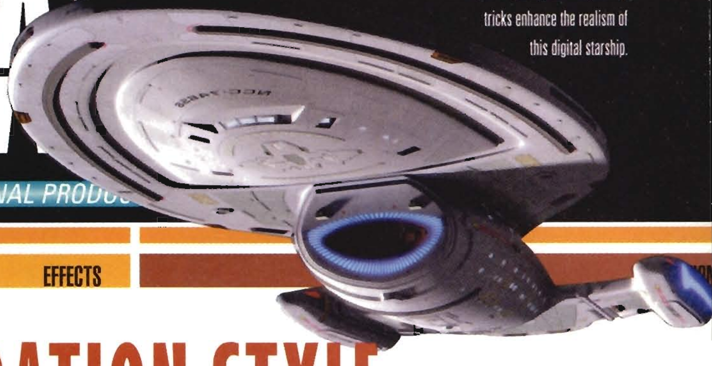
7. U.S.S. Reliant: Meni Tsirbas built this ship for *Sacrifice of Angels*. For reference, we had a practical model (store-bought kits) that had been painted for use in *The Wrath of Khan* movie. It came in a crate with the model of the U.S.S. Enterprise. These were the two models that were shot in the nebula cloud when Kirk and Khan were facing off. Another practical was delivered to Digital Muse as well, but because of its size (over six feet!), it could not fit through the doors and had to be shipped back. Reliants tended to get destroyed a lot, because the little "luggage rack" that goes across the top can fly off and since the rest is mostly dish, the burning going across the hull always shows up really nice.

8. Akira Class: Originally modeled by Vision Arts for *First Contact*, this ship was converted and retextured in LightWave for *Sacrifice of Angels*.

9. Steamrunner Class: Another model originally done by Vision Arts for *First Contact* and redone for *Sacrifice of Angels*.

10. Sabre Class: And still one more by Vision Arts for *First Contact* and redone for *Sacrifice of Angels*.

John Gross is the founder and owner of Digital Muse.
For more information, please visit www.dmuse.com



Special lighting and compositing tricks enhance the realism of this digital starship.

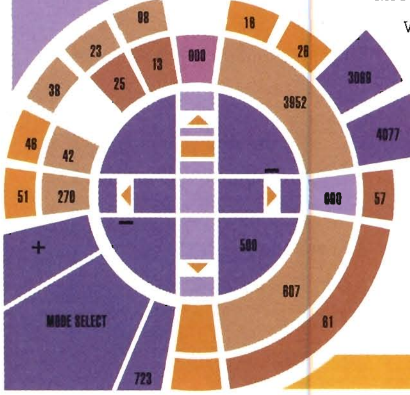
LIGHTING: FEDERATION STYLE

by
Aristomenis Tsirbas

Star Trek is arguably the most realized future world ever created for television. Because of this, many rules have been established over the years to give the show continuity and believability.

Lighting *Star Trek* CG models is no different, and it follows a legacy established over many years. During the first series way back in the sixties, and for the first couple of seasons of *The Next Generation*, the starship miniatures were lit evenly and brightly. The key light was typically placed behind the camera, with plenty of fill lights turned on to lighten the shadows. Around the time of the third season of *Star Trek: The Next Generation* though, almost the reverse became true. The key light was placed somewhere behind the model and often within camera view, strategically positioned to allow the surfaces to catch intense highlights. The fill lighting was reduced, but not eliminated.

To light a Federation vessel in the 3D world, follows almost the exact same rules as those used on a motion control stage. A key light is usually placed facing towards the direction of the camera, with the intensity almost always at more than 100%. Multiple fill lights at low intensities complete the scheme.



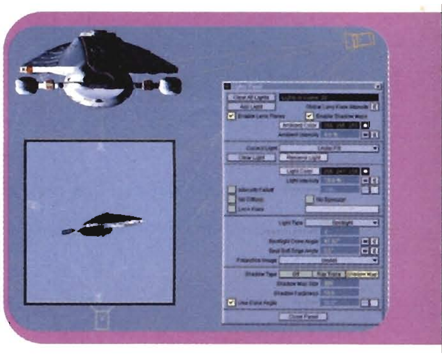
Much attention should be paid to tweaking the position of the key light, thereby achieving just the right shadow crawl along the ship's surface. A trick to remember is that many individual surfaces will not be properly exposed. The key lit surfaces should be a little too bright, while the fill areas should fall below normal intensities. This results in a more overall balanced image.

When lighting the starship Voyager, some lighting tricks can be used to enhance realism. A common problem that makes CG look synthetic, is how fill lights are used. One thing to always avoid is the use of LightWave's global lights Ambient Intensity setting. It's recommended to almost always set it to zero.

For fill lighting on CG ships, [Distant Light] with Shadow Type set to [Off] are most often used. A common problem is that these lights often don't shade surfaces realistically. Most notably, they don't shade the more recessed areas with less light, due to the lack of local ambient light. Using [Ray Trace] for these lights will only add unwanted sharp shadows that compete with light cast by the key light. One solution is to use [Ray Trace] [Area Lights]; but these increase render time considerably. A better solution is to strategically place multiple [Shadow Map] [Spot Lights] that track with the model. When Shadow Fuzziness is put to a high number (10 or 20), many surfaces receive very soft shadows, which gives the appearance that certain surfaces receive less bounced and atmospheric light.

For the Voyager, a good trick is to place a [Shadow Map] light directly underneath the ship. This projects a nice soft shadow within the crevice that joins the forward hull to the saucer.

We often render a separate specular pass. This way, natural looking hot spots can be layered in the composite. Other separate passes, such as windows and warp engine glows, can be tweaked to taste by the Visual Effects Supervisor during the post-production composite session.



All this attention to detail is vital to *Star Trek's* long-standing tradition of effects excellence. With a half dozen Emmy wins and countless nominations, *Star Trek's* visual effects are undoubtedly the most celebrated in television history.

Aristomenis Tsirbas (Meni) is a Director and VFX Supervisor at Station X Studios

WARPING LIGHTWAVE INTO THE FUTURE

By
David Stipes

How LightWave Came To Be An Integral Part Of Star Trek Special FX

Visionary concepts can inspire our imagination to greatness; but without the tools to accomplish goals, we can easily descend into mediocrity and frustration.

The Trouble With Tribulation

By my second episode of *Star Trek: The Next Generation*, I was already frustrated. I could not create satisfactory interpretations of the writer's and producer's vision with the technology at hand. It was limiting and insufficient to meet the increasing visual effects challenges presented by the futuristic series.

In 1992, the primary visual effects solution for spaceship shots was Motion Control photography of physical models. But, because the Models and camera rigs were limited by the physical laws of space, volume, and weight, this technique could not deliver all that the scripts demanded. Shots, such as a vast field of tumbling asteroids, were prohibitively too expensive to create.

In Search Of Solution

Hoping to find a better way, I began to explore computer animation programs. Many were expensive and had limited or costly vendor support. Any software or effects approach had to be reasonably priced so I could afford to learn it, understand its limitations, and intelligently apply its capabilities to the show.

My research revealed that other effects artists were achieving quality results with LightWave 3D. I made a call to NewTek for information, expecting to get mild interest and maybe a brochure. Their response was astounding. It seemed everyone at NewTek was an enthusiastic *Star Trek* fan and eager to support the show.

I was introduced to Joe Conti, John Gross, Grant Boucher and others who patiently answered my questions as I began to learn LightWave. On an Amiga 4000 with a Video Toaster, I was becoming educated to the possibilities of CGI and convinced that we could create *Star Trek* effects in LightWave.

In spite of my enthusiasm, several of the Star Trek producers and visual effects staff resisted and feared the use of CGI. Considerable criticism was leveled at the look of CGI, based upon the art direction of other shows. Some feared that CGI would put our model makers, camera operators, and digital compositors out of work.

I knew that an all CGI *Star Trek* effects universe was coming, and it was clear to me that there would indeed have to be changes. So, I urged our traditional model and Motion Control crews to learn LightWave.

Make It So

It wasn't long before LightWave found its way into *The Next Generation*, in shots requiring particle animation and minor set replacement. I had also begun using Amiga LightWave to build low resolution models of spaceships and to make moving story boards and simple animatics for some scenes. But, the producers resisted any kind of CGI spaceships in the show, and relied on stock shots for effects such as the Enterprise jump-to-warp (made with expensive slit-can streak photography techniques).

Star Trek: Voyager, however, presented a new opportunity for CGI and LightWave. *Voyager* needed new warp shots and other unusual effects which couldn't be done with traditional techniques. By now, LightWave had been ported to the powerful DEC Alpha Computers and with improved rendering speed and LightWave's ability to stretch and manipulate 3D objects, it was an unavoidable choice for *Voyager*.

And so it came to be that Amblin Imaging was brought in to create a LightWave Voyager model, and a number of complex scenes for the *Voyager* pilot, *Caretaker* - an effort that later earned them an Emmy. When Amblin Imaging closed, Star Trek commissioned other facilities, like Digital Muse and Foundation Imaging, to provide ever more challenging, and award winning, LightWave shots for *Voyager*, and eventually *Deep Space Nine*.

To Boldy Go On

LightWave is a product of the future that has forever changed the way that *Star Trek*'s visual effects are done. Without it, a number of technically difficult episodes simply could not have been produced. The courage to use new technology has allowed the *Star Trek* writers, producers and visual effects artists to discover and explore their visions of the future. Isn't that what *Star Trek* is all about?

David Stipes is an Emmy awarded Star Trek Visual Effects Supervisor who worked on The Next Generation, Deep Space Nine and Voyager series.

TOAST MASTER

It's easy to create transporter and camera shake effects with your Toaster.

BEAM ME UP, BOHUŠ!

Star Trek Special FX For Your Toaster

by Bohuš Blahut

You know what's neat in *Star Trek*? You don't have to hop on the bus anymore. You just stand on a Fresnel lens mounted into the floor and they transmit you anywhere you want to go. Neat, eh? It's got to be a cool experience, too. First you hear the captain say "Energize", your body turns an alarming flame color, you materialize on a planet made of cat litter and styrofoam rocks, then an alien vaporizes you because you're an ensign and you were stupid enough to wear a red shirt.

On *Star Trek* (I'm talking about the original show), these impressive effects were achieved through a film process called Optical Printing. It was expensive, time consuming, and hard to keep clean. Optical printing basically involves shooting separate film elements, then reshooting the layers with a special camera. You could liken it to using a video camera to shoot video playback off of your monitor. These days, the hassle of optical printing tasks has been replaced by easier to use computer processes.

One of the things that the Video Toaster introduced was the idea of organic transitions. Affordable switchers only offered boring geometric wipes. The Toaster brought in radical new things like the Spray Paint Wipe, the Pour Wipe, and Kiki Wipes. Previously, these kinds of wipes weren't very accessible. Film editors could do these kinds of elaborate effects, but video editors? Not before the Toaster.

Beam Me Up...

Toaster 3.x boasts some unusual wipes that don't have a rigid defined shape; instead, the video determines how the transition will appear. These wipes are very flexible because they look different every time you use them. In Toaster 3.x, look in Bank [F] for an effect called "noisy trails" - we'll be using that for this tutorial.

Unfortunately, Toaster 4.x didn't retain these mega cool wipes; but there is a similar transition in the Dissolves directory called "fade grainy". There are also some others there that you might want to consider using.

In addition to your Toaster, you'll need a sturdy tripod for your camera. This effect depends on having a locked off camera - "locked off" means that your camera is rock steady. The shot cannot be a pan or hand-held.

1. Shoot a scene of your captain's teary farewell to the natives. Have him explain for the tenth time, that they can't have access to the same super cool technology that allowed him to interfere with their quaint alien ways.

2. Next, shoot the captain and his away team posing to be beamed up. Hold on the shot for several seconds - You want to leave time for the special effect to disperse their bodies. I would also make the extra effort to darken the room lights and illuminate the team in some eerie colored light.

3. With all of the lighting exactly the way that it just was, have everyone get out of the shot. Keep the camera running - tape is cheap, and you don't want to risk moving the camera by poking at the REC button. Record a few seconds of that shot, then fade the lighting back to normal.

4. Now we add the beam out effect. On the Switcher display, [Freeze] a Framestore from the video you shot with no actors in it. [Save] it as a [4 Fields] image to retain the maximum resolution. You shouldn't have

OBJECTS
BONES
LIGHTS
CAMERA
ADD
CLEAR
• 89454643847
09234792844
• 25216556485
58043579045
• 02387534054
• 07808043756
75667587670
43704745340
RESET
RENDER

MOVE PIVOT POINT
PARENT

to stabilize the picture since you're grabbing a non-moving image.

5. Select whatever wipe you've decided to use (as discussed earlier) or drag it into the Project area of your display. Set it's Speed to [S]low. In 3.x, you can go to the [Setup] panel and select [Variable] for Effect Speed. This will let you set the Speed to the exact number of frames that you want the effect to take.

6. Have the Framestore ready on the Preview bus, [DV1] or [DV2].

7. Start rolling your footage of the away team getting ready to beam out. Once they are standing still, and the optional lighting has taken place, press the [Space Bar], or click [Auto], to trigger the effect - and watch them gradually dissolve away. You can also drag the T-bar down manually to beam them away - just like they did on the show!

If you did the optional lighting, your next edit can just dissolve from the Framestore back to the footage just before the lighting turns back to normal. If your camera was truly locked off, the transition will be seamless.

Wow! That's pretty simple. Beaming them back in simply involves dissolving from a Framestore of a locked off camera, to footage of actors in their places. Pretty cool, eh?

All Eyes On The Captain!

A good way to add more life to the scene is by adding people off to the side watching the beam out happening. This split screen effect will take a little orchestration, but it's not much more difficult than the regular beam out effect.

This next part will require that you have an A/B roll system for post production. Back when I created this effect, I didn't have an editing deck for my B roll. I just ran a pro-sumer S-VHS deck into a TBC, and then into the Toaster. After taping a few trial runs, this worked out just fine.

8. Your camera should still be positioned as before – it's imperative. Now, move all of your onlookers into the scene and off to one side. When you start shooting, you may want to have them act amazed. Make sure that they don't throw their arms around wildly or move too much, we don't want them to accidently stray into the other half of the scene, or they'll lose limbs when we composite this scene with the beaming we did previously.

9. Now fade the lighting back to normal and shoot some more footage.

This effect requires two tape passes. Some editors shun creating effects through multiple tape passes. Of course there's some generation loss; but good TBCs, well lit and composed footage, and quality decks will minimize this. Besides, people's eyes will be on the effect not on the slight softening of detail. Obviously, you should use the highest quality tape possible, particularly when you're doing multiple passes.

10. Create the beam out segment as detailed earlier, and record it on to a video tape. You'll be copying from this onto your edit master in a moment. Make sure to leave the still frame up for plenty of time at the end of the clip.

11. Put the tape with the finished beam out effect on it into one of your play decks. Connect it to Source [1].

IK OPTS
RESET

12. On the other play deck, cue up the footage of the onlookers. Connect this to Source |2|.

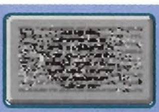
13. 3.x users should go to Bank [D] and select the "soft wipe left" or "soft wipe right" effect, depending on where you positioned your onlookers. 4.x users should find "wipe soft l-r" or "wipe soft r-l" in the "SoftEdge" directory and select it.

14. Using the T-bar, wipe between Sources 1 & 2. This will combine the onlookers and the beam out. The wipe's soft edge will help hide the seam between the two scenes.

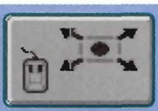
15. If you had the onlookers act surprised, cue that up to the moment that the away team disappears.

16. Commit this edit to tape, and when the away team vanishes completely, you can complete the soft wipe so that we are seeing the video of the onlookers. Once the lights fade to normal, the onlookers can mill about wherever they want to.

The next time you watch *Star Trek*, watch carefully to see these effects There are several episodes where you can see the seam between the optical effect of Kirk's crew beaming out, and the thronging alien masses. Having the split screen up for only a few moments, then letting the actors walk over that imaginary line will help sell the effect to an audience.


noisy trails (3.x)

fade grainy (4.x)


positionable expand

soft wipe left (3.x)
wipe soft l-r (4.x)

By creating an insert tape, you can first create all of the effects that you'll need for a show before editing. This approach also lets you consolidate all of your multi-layer effects onto a single tape - this also means that you only need to rent or borrow a second deck for a short amount of time.

Flyer users can create this same type of split screen effect using RenderFX or LayerPlayer.

Everybody Left! Now Right! And, Left Again!

Okay, so now you've beamed aboard the Enterprise. No sooner have you settled into your chair, when the ship is pummeled by photon blasts from a Klingon Bird Of Prey. The bridge is rocked, while the crew lean heavily from side to side. You look down and realize you're wearing a red shirt again, so you obligingly fling yourself over the nearest banister.

There's not a lot of mystery to this effect, right? They shook the camera and all of the actors tried to lean in the same direction at the same time. You can reproduce this effect by shaking your video camera; but it isn't the same as shaking a film camera. A film camera has a more dependable transport than a video camera. Shaking a video camera can cause the tape to come off of the heads momentarily, which loses your picture. I've also experienced more video noise in a shaken video camera's image.

Also, if you're using an on-camera microphone (which you almost never should) you'll pick up lots of racket from the camera itself. Another problem that you can run into is shaking the camera too far - what if you shake it so much that you accidentally see the lights or the top of the set? Is there a controllable way to shake the camera in post production? Of course there is!

This technique uses one of my favorite Toaster effects, "positionable expand". It's intended purpose is to grow video from a size and location you define, to full screen. I have found many unintended ways to use this effect however, and this is one of the easiest.

1. In 3.x, go to the Setup screen and set the DV3 Color to Black.

2. Set the Main bus to [DV3].

3. Bring up the video to be shaken on your Preview monitor.

4. 3.x users should go to Bank [D] and select "postionable expand". 4.x users can find that effect in the "Special" directory.

5. Pull down on the T-bar until your video is full size (you can also use the right mouse button and roll the mouse toward you).

6. Center the picture and start rolling tape.

7. Once the quaking scene comes up, start shaking the mouse. There's a real technique to it, so practice.

There are several different ways to do this. Sometimes I'll pound on the mouse pad to subtly bounce the mouse around a little. Other times, I find it good to subtly start off the shaking, build to a climax, then slow it down again - if it's appropriate. You also don't want to get too wild and risk revealing the black edges behind the moving picture.

You'll be surprised at just how little mouse movement is required to sell this effect. If your monitor supports it, you may want to check both overscan and underscan to make sure that this is going to look good on a regular TV (or wherever your eventual audience will be seeing it).

This ability is also quite unique - you're not going to find a lot of affordable switchers that will just let you grab the video and shake it manually. I've used this technique in fiction as well as music videos - you never know when you'll need to shake things up a little.

Now, Go Out and Have Some Sci-Fi Fun

Now that you can shake the camera and beam things in and out, that's pretty much Star Trek in-a-can. Isn't it?

As usual, please feel free to send me clips or stills from any of your projects that use the techniques that you've learned here. Also, feel free to email me about any techniques you are curious about or that you would like to share with other Toaster users.

Bohuš Blahut is the director of The Vantage Point and creator of the Catalyzer tutorial video series. You can email him at bohus@xnet.com

DVS Direct

Orders 800-379-7267

69 Beaver Dr. Suite 110 DuBois Pa 15801
PH 814 371 5640 FAX 814 371 2033

Your Direct Source for Desktop Video

The New Video Toaster® for NT

The cutting-edge, uncompressed video editing, 2D/3D animation, compositing and image manipulation system. Leveraging over 12 years of experience as an industry leader and pioneer in the desktop video 3D, and 2D paint and animation markets, NewTek has created a product that contains award winning tools for creating better than broadcast quality television.... at an unbeatable price! **Uncompressed & Uncompromising** The New Video Toaster offers quality that's second to none. ALL video is ALWAYS stored in its native, uncompressed D1 video format. Unlike other products that show compression artifacts, the New Video Toaster maintains the original pristine quality no matter how many layers in your project. Comming In June 99 .

SAVE UP to $1500 on the Video Toaster NT system . Newtek is currently offering $1000 off the price of the new Video Toaster for NT to All registered Toaster Owners . DVS Direct will offer an additional $500 off when you purchase our new MEGA NT system. with the Video Toaster NT . Some restrictions apply

Save Big On the Classic Video Toaster

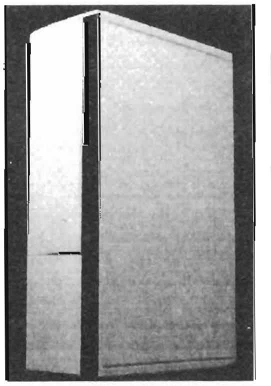
MEGA 4000

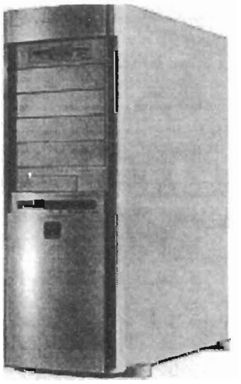
Toaster /Flyer System

- **MEGA 4000DT ***
- **50 MHZ 060 w 66 MB ram**
- **32 X SCSI CD Rom**
- **2 GB SCSI System Drive**
- **Video Toaster /Flyer 4.2G**
- **2 18 GB Video Drives**
- **1 2 GB Audio Drive**

$8995

Monitor Not included
*The Mega 4000DT system uses reconditioned Amiga 4000 Desktop Motherboards which carry a 1 year warrantee





TowerHawk Plus

Toaster/Flyer System

- **TowerHawk 1200**
- **50 MHZ 060 w 32MB ram**
- **Toaster/Flyer 4.2G**
- **40X IDE CD Rom**
- **4 GB IDE System Drive**
- **2 slot ISA POWER BUSS**
  A DVS Direct exclusive
- **2 18.. GB Video Drives**
- **1 2 GB Audio Drive**

$7995

Monitor Not included

Seagate

Flyer Ready Drives
18 GB 799
9 GB 599

Save time Grabbing Pictures with Snapshot
$69.96

Add a Video Flyer
To Your Toaster System with 2 18 GB Video Drive and 4 GB Audio Drive
For Only **$4995**
Optional external 7 Drive Bay and Octopus cable add $499

MEGA 4000 Expansion case

Convert your Desktop Amiga 4000 into a full tower. The Mega 4000 Tower conversion kit will give you more room than any of the other expansion cases on the market .

Here are the specs:

- Full Tower Case
- 11 slots including 3 Video slots & 5 Powered ISA slots for TBC's, Vscope ect.
- Uses a standard 300 Watt Power supplly upgradable to 400 or 600 watts
- 8 Drive Bays
- Dual Cooling Fans.

MEGA 4000DT Only $599

MEGA 4000AT Only $499
for the A4000 Tower

ASIMWARE
Audio Thunder $69
CD FS 3.8 $69
Master ISO $169

MegageM
AV8R PRO $299
AV8R PRO+ $349
AV8R Jog Wheel $289
AV8R LANC $190
AV8R RS 422 $129

Flyer Mastery Guide
$ 129

Nova Design
Image FX 3.2 $229
With free Video

OZWare
CoPilot Video $89
CoPilot Audio $89
Speed Zone $89
FastFrames 2.0 $79
Mulitcam Editor $139

ProWave
Render FX $125
ProMix $89

Visual Inspirations
Control Tower $139
Decision Maker $199
Decision Maker LANC $399
Decision Maker RS 422 $399

IF YOU NEED SOMETHING NOT LISTED PLEASE CALL

Prices are subject to change without notice. Call for current pricing. We are not responsible for typographical errors. 15 % restocking fee for all items returned and not exchanged for same. Prices do not include shipping. PA residents add 6% sales tax. All warranties subject to manufacturers terms and conditions. Lease subject to approval by Bankvest Capital.

Web # 304

FLYING HIGH

Create high-quality special fx using roto-scoping techniques in ToasterPaint.

A BLAST FROM THE PAST

Star Trek Special FX For Your Flyer

by Bohuš Blahut

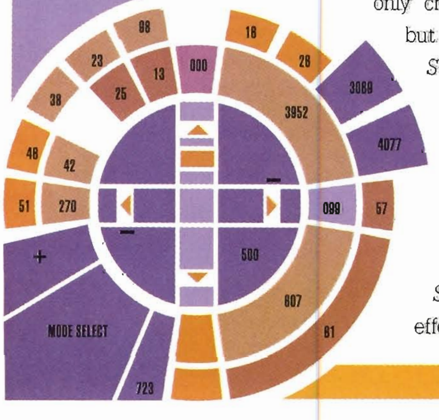
Many of the visual effects in the original *Star Trek* were done with a technique called rotoscoping, or hand animation. Variations of this technique date back to George Mellies' 1918 film *Voyage To The Moon*. This silent movie was a marvel of special effects in its time. These types of movies were called "trick films", a precursor to today's explosion laden blockbusters. The way that Mellies achieved many of his effects was to actually paint on the individual frames of the film.

About twenty years later, the Fleisher brothers (creators of such lunatic cartoons as *Betty Boop* and *Popeye*) patented their Rotoscope. This device let them film an actor dancing, then project the captured frames onto cels; thus allowing artists to intricately trace these movements and translate them to their cartoon characters.

The same basic animation technique has long been used in science fiction films, notably *Forbidden Planet* where they used it to not only create laser blasts, but an entire creature. *Star Trek*'s creator Gene Roddenberry often cited this film as an inspiration.

The technique used by *Star Trek*'s special effects geniuses was more or less the de facto in Hollywood, until only a few years ago. Now, more and more effects houses are foregoing the expense and hassle of creating these kinds of special effects on film. Instead, they have moved to the digital realm to create their magic. The good news is that the Flyer has always had the same kinds of tools that these artists use every day. Who of us hasn't dreamed of creating a science fiction epic of our own using the Flyer?

Once you've dreamed up your sci-fi opus, you're very likely going to want phaser blasts. So, let's learn how to do that.



Choosing The Right Weapon

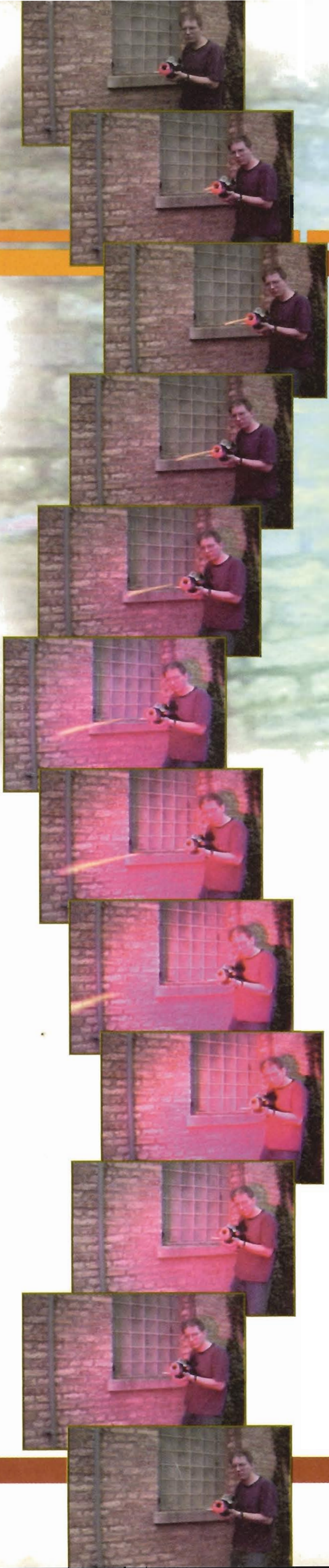
The first thing you need to do is set up a good action scene and prepare to shoot some footage. Once you've got your set and costumes figured out, all you need is a gun of some kind. I often start with a plastic gun from the toy store and glue various bits and bobs onto it. The gun that I used in this tutorial project I got from the Salvation Army Thrift Store in my neighborhood. It set me back a wopping sixty cents. One important consideration is to make sure that you can clearly see the business end of the gun in the frame, since we will be using it to anchor one end of our phaser blast. If you can't find something to use for a ray gun, you can always have your character shooting beams out of their eyes or fingers.

Lights, Camera, And Fake Action

Now that everything's ready to go, it's time to shoot some footage. Basically, all you have to do is act out some kind of scene with your actor pretending to shoot his weapon at someone - or some thing. Make a good show of it.

I pretended to fire off two volleys of phaser blasts, pulling my body back a bit each time to simulate a bit of recoil from the gun - kinda silly since the gun shoots a weightless light beam, eh?. It's really no different than hearing explosions in space - call it sci-fi reality!

We also used an off screen light to flash at me in time with the motion of the firing gun - it's that glow around the gun which you can see in the single frames shown here. This interactive lighting suggests that the phaser blasts are throwing off all kinds of light, and helps sell the effect as really being in the scene. This requires coordination



between actor and director. If we were doing this kind of effect a lot, I'd rig the light to be activated by the actor pulling the gun's trigger. I'd also put an explosive charge in the end of the gun to get a flash out of the muzzle.

Taking It Into Post

Once you've got your footage digitized, split it up into segments so that the phaser blast segments are isolated clips. Call the parts "Phaser1", "Phaser2", "Phaser3", etc. Make sure when you're splitting up the clips that you use the little arrow gadgets next to the numeric fields. The Flyer has strict requirements of where you can and can't edit a clip, so using the arrow gadgets will ensure that you don't try to edit somewhere you can't. This will be important later. Set your In point to a few frames before you want the effect to start, and set your Out point to a frame or two after you want the phaser blast to exit the frame. Keep in mind that a phaser blast should be very fast - not even a whole second by my reckoning.

The reason we want to separate the sections to be rotoscoped is that it makes file management easier, and also facilitates redoing sections if necessary. It also helps you gauge how much rotoscoping is necessary for a particular clip. If you have a ten frame clip, then you know that by frame five the phaser beam has to be about halfway across.

Now go to the [Programs] pop-up and start ToasterPaint. This is where we will do the majority of our work.

1. On the toolbar, click [Disk] to go to the file management panel.

2. Under Save, click [Clip Name]. Navigate to one of your video drives (preferably the directory where you have the other phaser clips) and enter the name "Phaser2_roto". Remember NOT to use spaces in your filenames. This doesn't actually save anything right now. It sets up a name and a location for your fields to be saved.

3. Back at the main panel, click [Tools]. This is where you choose from ToasterPaint's variety of painting styles, brushes, etc. Set Draw Mode to [Range]. This means that any tool that you use will draw with the gradient to the right of your Color Strip.

4. Go to the [Color] panel. On the left side are the RGB sliders that let you define colors in the palette. At the upper right you'll see two buttons, Center and Edge. These buttons allow you to set the colors to be used when painting in Range mode. Center refers to the color that is in the center of whatever shape that you draw, while Edge will hug the edges of the shape. Using the RGB sliders, create the following pale yellow color: R:235, G:235, B:180. Then click [Center].

5. Next we want to create a fiery red for the edges. Set R:235, G:0, B:0 and click [Edge]. Note that none of these values go over 235, to insure that the colors stay within the limits of NTSC video. Higher values will cause bleeding in your image.

6. Back on the [Tools] panel, click [Transp/Warp]. We will use these controls to create a beam with a soft edge that will blend into the background of your video

7. Select Point transparency by clicking the button that looks like a checkered ball.

8. Again, you'll see controls for Center and Edge. These percentages allow you to vary the transparency in the center and edge of whatever shape you draw. Set Center to 20, and Edge to 100. This will make the beam that we draw semi-transparent.

Almost all of the preparation is done. We've got all of our painting tools set up. Now all we have to do is tell ToasterPaint which clip we want to use, then we'll be able to step through a field at a time and draw the phaser blast right on top.

9. Now go to the [Process] panel. This section lets you choose FlyerClips and perform image processing on the entire video clip. Most often, you would use this for full screen tinting or the addition of geometric shapes.

10. Click [Source Clip] and choose the clip that you're going to rotoscope.

11. In the From Source Clip section, click and hold the right arrow gadget next to Frame #. Your scene should now be playing on your program monitor. This is good for getting a feel of the pace of the clip. Go back to Frame 00:00:00 and click [Load Field 1].

Before you start drawing in the phaser blasts, you should determine the direction that the blasts are going to shoot. This takes a little artistic skill. If you want your shot to look realistic, you'll want to draw the blast in perspective. This will give it some added dimension. I took two pieces of tape and taped them onto my Toaster monitor's screen. The strips made a triangle with the point at the gun's muzzle. This makes an excellent template. It took a little experimentation to get the perspective right. What's nice is once the blast leaves the gun, it will continue to go down that same path - you don't have to worry about shifting the tape until the session is done.

12. Draw the phaser blast right onto the video. You may want to draw a rough comet shape to represent the phaser fire. For this, my favorite drawing tool is the Solid Polygon/Vector Line tool. Go to the [Tools] panel and click on the [triangle], and also [Solid]. I use this tool even for round shapes because it offers you a lot of control. Your first blasts will be little more than an elongated diamond shape, but later on, as you travel down the lines of perspective, can grow quite large and require you to click down more and more points.

13. Once you're finished, press [i] to save the current field to the clip that we named earlier.

14. Using a dry erase marker, draw a line on your monitor to show where that blast ended. This way, when you load up the next field, you'll have a reference for where the last blast was.

15. Now, back on the [Process] panel, click [Load Field 2]. This will load the second field from the same frame that you just worked on.

16. Draw your phaser blast going a little further than the marker line that you made on your monitor screen.

17. Once finished, press [i]. This will append the current field to the clip that we're building. You've just created a frame's worth of rotoscoping! Don't forget that you'll need to create at least another two fields, in order for the Flyer to be able to play it back.

NOTE: The Flyer requires two whole frames (that's four fields) to accurately display color info. Also, when you are in the process of rotoscoping, you need to make sure to run all of your fields through this clip building procedure, regardless of whether you draw on them or not. So, make sure you press [i] for EVERY field in the clip.

18. Draw another dry erase marker line on your monitor's screen to indicate the blast's progress.

19. Use the right arrow gadget next to the Frame # display to advance to the next frame. Return to Step 12 and repeat through to the end of the clip.

In order to see what you've done, go back to the [Switcher] and make sure that you're in a Files view. Your finished clip will not have a crouton on it, but it will play just fine. If you want to add a crouton, just go to the [RxTools] folder and double-click on the [ChangeIcon] crouton.

Final Assembly

When you've got the phaser look that you want, it's time to put everything back together. Drag all the parts of the phaser blast scene, except for "Phaser2", into your project. Then get the new rotoscoped version of scene 2, "Phaser2_roto", and drop that in place. You'll also need to go into each clip and pull its In and Out points all the way to the ends of the clip (the Flyer automatically adds a second of padding for transitions). Dim the lights, click the Play button, and start planning the sequel.

Things To Think About

There are plenty of opportunities for artistic decisions here. Ask yourself questions like: How fast does the blast go? Does it change color as it progresses? How long should it be? Another great benefit is that since you're working frame by frame, this will work equally well on hand-held footage. Just make sure that your action isn't moving so fast that people are running ahead of the blasts. The most important thing to do is practice.

Rotoscoping is one of the most flexible techniques for film and video that there is. Literally anything is possible. I've used this technique to change one person in a color scene into black and white, and to make one person remain crystal clear in a heavily blurred scene. The technique is easy to learn, but the actual task of rotoscoping is, by its nature, very laborious - but very powerful in the hands of the patient artist.

Bohuš Blahut is the director of The Vantage Point and creator of the Catalyzer tutorial video series. You can email him at bohus@xnet.com

TO ORDER CALL 800-544-6599
MONDAY-FRIDAY 9-6, CST
INFORMATION 262-548-8620 • FAX 262-548-8130
TECH SUPPORT/RMAs 262-548-8159 • 12-4 PM, Mon-Fri.

ORDER ON-LINE • www.sharbor.com

VISIT OUR Internet site www.sharbor.com

Shop our secure online store for a bigger selection and more information about each product at www.sharbor.com

Safe Harbor Computers -

Your #1 Source for Digital Video, 3D Animation, and Multimedia Products.

HARDDRIVES/STORAGE

Seagate Quantum™

Guaranteed Low Prices!

IBM Ultrastar 25L1790 9GB Narrow	
Seagate ST136475LW 36GB Barracuda	
Seagate ST3136403LW 36GB Ultra2 Cheetah	Call
Seagate ST150176LC Ultra2 Barracuda	Call
Seagate ST39175LW 9.1GB Barracuda	Call
Seagate ST39103LW 9.1GB Cheetah	Call

NATUREFX
WATER.SKY.CLOUDS.WAKES

NatureFX allows you to create tides in stormy seas, realistic ripple effects, and haze that changes color depending on the angle of the source. NatureFX can also create 2D and 3D rainbows that show through haze. Check out the movie *Deep Blue Sea* to see this remarkable product **489.00**

Grime	170.00
Realitools Vol.2	175.00
Particle Storm 2	389.00
Particle Storm 2 Jr	239.99
Lume Tools Complete set	440.00
Tree Druid	150.00

The LightWave 3D Plug-in Experts for Intel, Mac, and DEC!

SALE PRICES!

Dynamic Realities

NEW!

SECOND FX – A set of shader plug-ins for LightWave 3D, which creates realistic images of cloth, hair, fur and so on. This package includes six shader plug-ins; FX Transparent, FX Velvet, FX Tuya, FX Mouton, FX DeForm, FX SoftLight, and a complement plug-in FX Field. You can easily create realistic animation with these plug-ins, which can accurately simulate the physical characteristics of the real materials...**189.00**

Motion Designer 2
The powerful physical simulation plug-in for LightWave is now available in Version 2! It provides new functions such as self-collision, collision among multiple objects, and more. Motion Designer 2 is highly effective in creating animations of objects such as cloth **369.99**

Motion Gang **229.00**

Polygon Eater – A reduction plug-in for LightWave. It quickly reduces the number of polygons to the number desired, while maintaining the characteristics and overall shapes of models. Also, enables you to control reduction for each part as well as for the whole model **129.00**

PGL – PGL is the plug-in that applies the bone deformation, different from that of LightWave 3D. It allows you to create animations that use more advanced bones with applying deformation, completely depending on certain bones without the effect of surrounding bones..**189.00**

PolygonEater
PGL

D STORM, Inc.

THE JOY OF SIX!

LightWave [6]
The new version of the award-winning 3D animation system from NewTek! Powerful new tools include enhanced interactivity and scene editor, Skelegons, MetaNURBS in layout with point weighting, caustics, UV Mapping, surface editing in modeler and a whole lot more! (specifications subject to change without notice) LightWave 3D is the most-used animation system on the planet! What are **you** using?.. .....**2495.00**

Visit our new site,
www.joyofsix.com *for more information.*

Graphics Studio	Call
Hypervoxels 2.0	249.00
Inspire 3D with LD_Tools	429.99
Motion Pack	219.00
LightWave [6] Upgrades	Call
Aura	Call
Aura Complete	Call
Calibar Test Signal Generator	Call
Film Grain	115.00

Video Toaster NT
Never again compromise the quality of your video - lossless video editing is now available on your desktop! Introducing Video Toaster NT - the next generation, uncompressed digital video solution from NewTek. For only $2995, your complete post-production studio includes:

- Speed Razor (award-winning non-linear editing)
- Aura (2D graphics, manipulation & compositing)
- Lightwave (professional 3D animation)

Already own a Video Toaster, Flyer or Lightwave? Save $1000 when you upgrade to the Video Toaster NT through December 31, 1999.

Complete reliable, quality turnkey Toaster workstations are also available!

Visit our website
www.videotoasternt.com

The #1 Video Toaster resource on the planet is VideoToasterNT.com! Accurate and detailed Video Toaster NT information including specifications, answers to your frequently-asked questions, technical support help, extensive forums and our exclusive custom turnkey system builder providing an INSTANT quote.

NewTek

TUTORIALS

After Effects Boot Camp 1-4	each 39.99
Animation Essentials	39.99
Aura Convergence	40.99
Aura Initiation	39.99
Aura Video	25.99
Character Animation/Human Head	39.99
Cinematic Visual Effects	39.99
Digital Cinematography	39.99
Kinematics & Contortions	39.99
LightWave 3D Advanced Explosions Techniques	39.99
LightWave 3D 5.6 Natural Effects	39.99
LightWave 3D Essentials Bundle	239.99
LightWave Surfacing Techniques	39.99
Lighting & Camera Effects	39.99
Organic Modeling and Animation	39.99
PhotoShop Artistic Effects	39.99
PhotoShop Creative Compositing	39.99
PhotoShop Essentials	39.99
Plug-in Power	39.99
Power Modeling	39.99
Ron Thorton Creative Magic	166.99
Stearner - Effects	39.99
Surfacing Essentials	39.99
TutorVision 3D CD #3	48.99
VideoSyncrasies	59.99

■ ■ ■ ■

Safe Harbor is dedicated to providing quality digital video, animation and multimedia products, technical expertise, and courteous, personalized service to our customers to maintain our impeccable reputation and total customer satisfaction.

Terms: POs accepted from schools and government agencies • No waiting for personal or business checks • Defective products replaced promptly. RMA number required (call 262-548-8159) for all merchandise returns. Returns not accepted after 15 days. Returned products must be in original packaging, postage prepaid. Opened software not returnable. Shipping charges not refundable. Returns subject to a 15% restocking fee • Not responsible for typos. Prices subject to change.

SAFE HARBOR COMPUTERS

W226 N900 EASTMOUND DR., WAUKESHA, WI 53186

Web # 305

TO ORDER CALL 800-544-6599
MONDAY-FRIDAY 9-6, CST
INFORMATION 262-548-8620 • FAX 262-548-8130
TECH SUPPORT/RMAs 262-548-8159 • 12-4 PM, Mon-Fri.

WE NEVER CLOSE

VISIT OUR
Internet site
www.sharbor.com

Shop our secure online store for a bigger selection and more information about each product at
www.sharbor.com

Safe Harbor Computers –

Your #1 Source for Digital Video, 3D Animation, and Multimedia Products.

Video Toaster NT Software Bundle – This is a great value! Includes AuraFX 1,2,3, Corporate Video Backgrounds, and Surface Pro for LightWave..**399.99**

AuraFX Vol. 1 – The first of the collection! Includes 30 effects for merging layers upon layers. Layers are merged automatically and checks for validity of correct layers and frames **139.99**

AuraFX Vol. 2 – Includes new scripts such as moving blurs, moving lights, fading effects, and wavy text. The Volume 2 CD is great for backgrounds and computer graphics work **119.99**

AuraFX Vol. 3 – Contains 20 new scripts.......................................**119.00**

Surface Pro/LightWave 3D Cd – 60 new seamless, image- based surfaces that are instantly available through LightWave...... ....**52.99**

Canopus DVRex-M1/Premiere - A high-performance digital video and audio editing system. The DVRex combines high-quality DV video with multi-channel audio support. This complete system comes with Adobe Premiere 5 1, Boris FX 3.5, breakout box, Rex Edit 2.5, and all the necessary cables **2399.00**

Canopus Rex RT Option - Add real-time effects to your DVRex editing system! **999.00**

DVRaptor - A complete DV camcorder editor which includes Adobe Premiere 5 1, Boris FX 3.5 and all required cables **699.00**

Animation Master 99
A powerful and professional 3D animation program. Everything you need to create fantastic computer graphics, 3D storyboards, business presentations, and film productions. A few of the new features in AM 99 include lens flare, smoke, steam, fire, and many more! A great program at an affordable price! **176.99**

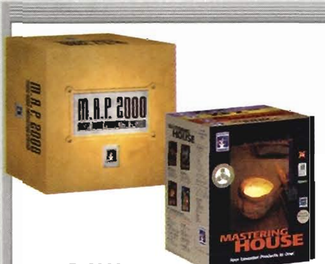
Animation Master 99/30 Creature Workshop Book.......**179.99**

Animation Master 99/Handbook Bundle **179.99**

Animation Master 99/Simbiont Plug-In Bundle..... ... .**219.00**

Virtual Trees & Foliage – Clip Maps
Hundreds of tree and foliage textures, all provided in clip map form with alpha channel transparency. This 2 CD set contains the following categories: 65 trees, 50 plants, 20 leaves, 21 hedges, 15 grasses, 25 branches and 15 barks. And for a bonus, Viewpoint mesh, and 10 breathtaking panoramic sky textures **129.99**

Seamless Textures - Downtown Surfaces & Signs...............**129.99**



M.A.P. 2000
A comprehensive suite of professional tools which all work together: create, edit, and deliver! Includes Acid Pro, Sound Forge 4.5, Noise Reduction, Acoustic Mirror, XFX 1,2,3, CD Architect, and more! **1899.00**

Mastering House Bundle
A complete package for recording- to-burning CD's. This bundle includes Sound Forge 4.5, XFX 1, XFX 2, and CD Architect....................................**479.00**

ACID Pro 2.0	259.99
ACID Libraries	Call
ACID Loops	most at 39.99
Acoustic Mirror	Call
Audio Anywhere	54.99
CD Architect 4.0	215.99
DirectX Noise Reduction 2.0	Call
Professional CD Factory	639.99
Professional Remix Factory	649.00
Sound Forge 4.5	274.99
Sound Forge XP 4.5	45.99
Vegas Pro – A professional multi-track audio editing system	549.00

Visit ***www.sharbor.com*** *and check out the Digital Music Handbook by clicking on Sonic Foundry.*

dpsReality

The world's first Studio Digital Disk Recorder! Features compressed or uncompressed recording, alpha channel, balanced/unbalanced stereo audio I/O and DPS Virtual Tape File System for group rendering. The package contains the dpsReality player application, Digital Fusion DFX compositing software, and an audio/video breakout cable. **2249.00**

dpsVelocity – 2D

The combination of hardware and software is what makes this real-time NLE system the ultimate choice. The **dpsVelocity – 2D** delivers faster, sharper, and easier edits at an affordable price. This real-time editing solution includes the dpsReality card, dpsReality player, audio/video breakout box cable, dpsVelocity NLE software, and so much more ....**Call**

dpsVelocity – 3D ....**Call**

Spark Plus/Video Action 6.3 ...**499.99**

Visit our site **www.sharbor.com** for more information.

Oxygen GVX1

A 100% geometry and lighting acceleration card which integrates the GLINT R3, and the GLINT Gamma G1 processor on a single AGP board **699.00**

Oxygen VX1

The VX1 uses the GLINT R3 processor to achieve true 2D and 3D superb graphics. In addition, it comes with 3DLabs' Pentium III-optimized OpenGL drivers for strength and performance **249.99**

Oxygen GMX....................... ....**1499.00**

Oxygen RPM.............. ....**799.00**

ORDER SECURELY ON-LINE • www.sharbor.com

ReelMotion 1.0 – A stand alone program on CD. Can be used with any animation program that supports Biovision or Acclaim motion capture file formats. **ReelMotion** is a realtime simulator that uses physics and collision detection to create realistic animations of objects and vehicles including cars, aircraft, motorcycles, helicopters and nearly any rigid body object........**634.99**

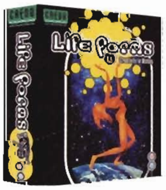
DarkTree Textures

A powerful next-generation system for designing your own static or animated procedural textures, that delivers stunning special effects, intense realism, and bizarre abstractions. The stand alone application renders procedurally generated texture maps, or plug shaders straight into LightWave, Animation Master, 3D Studio Max and trueSpace.........**289.00**

DarkTree Simbiont for Animation Master....................**55.00**

GRAPHICS SOFTWARE / PLUG-INS

Dinosaurs / 520 Photoreal Seamless Textures	79.00
Alpha CG	179.00
Animal Kingdom	109.00
Aqua Pack	156.99
Bryce 4	193.99
Complete Effects Library	399.00
Creature Creator Standalone	189.00
Digital Juice For NLE	289.00
DirtyUp	229.99
Dosch Textures Vol.1	77.99
Fiber Factory 2	119.99
Furistic	229.00
Hollywood FX	Call
Illustrator 8.0	359.99
Light ROM Super Bundle w/Leny	99.99
Macroform	289.00
PhotoShop 5.5	649.00
Power CG Original	295.00
Power CG Plus	395.00
Power CG / Speed Razor	259.00
Poser 4	229.00
Puppet Master, Intel/Mac	299.00
Pyromania Pro, Intel	169.99
Relativity	189.99
SmartSound Pro	259.00
Space Wars Digital Effects kit	119.99
SurfacesROM	45.00
trueSpace4	Call
TutorVision 3D CD #3	48.99
Visual Effects CD	159.00
World Construction Set 4.5	629.99



Life Forms 3.5 LE The latest version of the defacto standard for creating realistic figure movement for 3D animation. Its intuitive interface and powerful features will help you save time and be more productive than ever. Our new entry-level package gives you all the features of Studio without the application support of 3D content. Great for creating Quicktime movies, VRML output for the Web, input for Strata Studio or trueSpace...**179.00**

Life Forms Studio 3.5 - All the great features of LE, plus support for many of today's top 3D animation packages. The Studio version includes PowerMoves 1 & 2, a collection of over 750 motion files (valued at up to $5,000) to get you moving fast!....................**449.00**

CREDO
The Character Motion Company
www.charactermotion.com

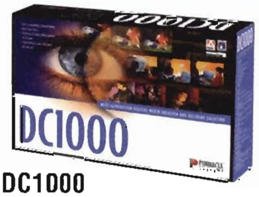
Genesis V2 Pro

A collection of high-end visual effects. **Genesis V2 Pro** gives you complete and infinite control over any kind of optical image you can create. Works with LightWave 5.x or Inspire 3D.......................**249.99**

Millennium – The long awaited upgrade for Toaster/Flyer users! A bountiful collection of software scripts, effects, fonts and backgrounds, and additional content designed to update your Video Toaster and Flyer................**349.00**

ImageFX 4.0
price after instant rebate....**199.00**

30 DAY GUARANTEE



DC1000

The DC1000 is a complete video editing solution designed for videotape, CD-ROM, and Internet video production at an affordable price. Using state-of-the-art dual stream MPEG-2 technology provides real time digital video editing and broadcast quality at data rates half that of MJPEG. Proprietary "SmartGOP(tm)" technology makes video editing on the DC1000 frame accurate. DC1000 is bundled with Premiere RT5.1, TitleDeko, and ACID Music. Also includes Minerva's Impression CD-Pro for authoring a CD or DVD. Options for the DC1000 include a DV I/O and a forthcoming component I/O. The DC1000 can be upgraded to DVD1000............**1899.00**

DV Option for DC1000 – High quality digital animation recorder and video editing solution. Record and edit MPEG-2 video. Use captured video in LightWave and record your animation back to tape...........................**1195.00**

DC1000/DV Option Bundle – Save BIG money when you order both! .**2699.00**

DC50...**Call**

DC30 Plus with **TitleDEKO**.......**729.99**

miroMOTION DC30 Plus
After $100 mail-in rebate..........**599.99**

DC30 Pro
After $100 mail-in rebate.........**599.99**

DC Pro Pack.............................**139.00**

DV200.......................................**399.99**

DV300 After $50 mail-in rebate.**549.99**

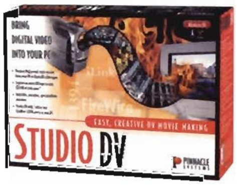
DV500

The new real-time DV editing solution. Output to DV or analog videotape, or post your video to the web, to CD-ROM or to DVD. The DV500 comes bundled with Adobe Premiere RT 5.1, TitleDeko Character Generator, Pixelan software's Video Spice Rack, FreeFX, ACID Music, and Minerva Impression ....**899.00!**

Studio MP10
After $70 mail-in rebate............**169.99**

Studio 400
After $30 mail-in rebate..............**95.00**

Studio DC10 Plus.....................**199.00**



Studio DV

The quick, easy and inexpensive way to get capture, edit and playback video directly from your DV camcorder. Use the video in LightWave 3D to enhance your animations.
After $50 mail-in rebate...........**149.00**

Receive a FREE 8" desktop tripod with any Studio MP10, Studio DV, and Studio DC10 Plus through January 31, 2000.

SPECIAL OFFER!

For complete workstation configurations and much more information, check out
www.dvguide.sharbor.com/dc1000

PINNACLE SYSTEMS

■ ■ ■ ■

Safe Harbor is dedicated to providing quality digital video, animation and multimedia products, technical expertise, and courteous, personalized service to our customers to maintain our impeccable reputation and total customer satisfaction.

Terms: POs accepted from schools and government agencies• No waiting for personal or business checks• Defective products replaced promptly. RMA number required (call 262-548-8159) for all merchandise returns. Returns not accepted after 15 days. Returned products must be in original packaging, postage prepaid. Opened software not returnable. Shipping charges not refundable. Returns subject to a 15% restocking fee• Not responsible for typos. Prices subject to change.

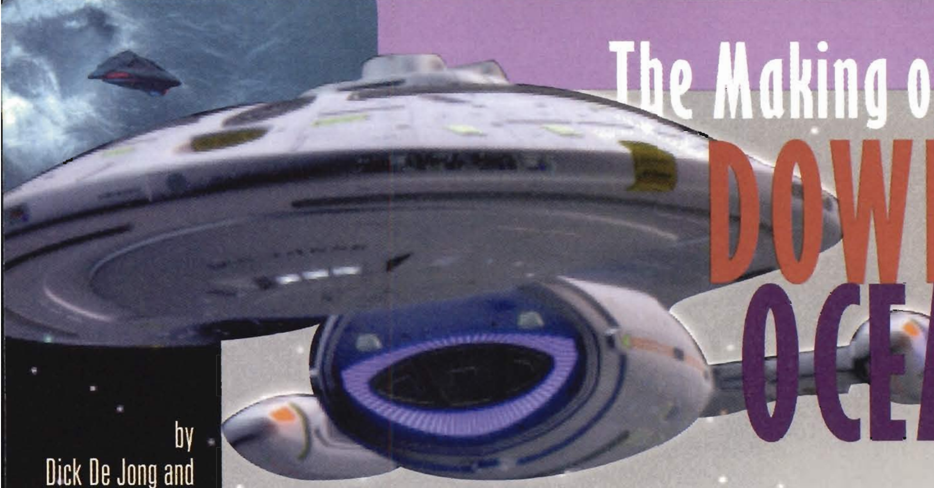
SAFE HARBOR
COMPUTERS

W226 N900 EASTMOUND DR., WAUKESHA, WI 53186

Web # 306

The Making of Thirty Days

DOWN DEEP in the OCEAN PLANET



by
Dick De Jong and
Molly Dinkins

In *Thirty Days,* Voyager encounters a strikingly beautiful and unusual ocean planet held together by a mysterious ancient gravity generator built by a long lost civilization. The current underwater inhabitants, the Moneans, have constructed an elaborate ecosystem.

"Ron Moore [Star Trek Visual Effects Supervisor] was very excited because it represented a new look on a *Star Trek* episode," said Bruce Branit, the Digital Muse CG Supervisor. "Usually we put the same space ships in the same space. The lighting and all that stuff has been set for years and years."

"It's unusual for us to do a show that is underwater," Moore added. "I know we've never done it in my thirteen years with Star Trek." Indeed, this hydrous orb has no landmasses, just wave after wave of water - shining sea as far as the eye can see.

"It was a little difficult because the planet was so small," Branit said. "They wanted to see a curvature on the surface of the planet and the horizon, too. The horizon was closer than you thought it would be. We had to walk a fine line in maintaining a stormy realism with what this ball of water in space might look like."

"If you look at earth from space, the oceans are absolutely flat blue - you can't see any waves at that scale. We went back and forth on how dynamic this should look because the more dynamic we made it, the smaller the scale looked."

"The water on the surface was just a lot of layering of basic LightWave techniques," described Branit. "The general ocean objects were geometry with a lot of creative use of image, bump and displacement maps, with a couple water elements for some splashes."

Digital Muse has been specializing in recreating water since before it was Muse. Before he founded the studio, John Gross worked at Amblin Imaging on the *seaQuest* TV series. When *Thirty Days* surfaced, Muse was the logical candidate. "But one of our directives was 'Don't make it look like *seaQuest*,'" Branit explained. "So we tended to make the water a little more cloudy. One problem was that the underwater city was so vast, that the fall-offs we were using for the murk of the water made it so we couldn't get any wide, dramatic shots of the city. For those shots, we allowed it to be a little clearer."

"We also did a lot of changing the tones of the colors going from teals to blues to blacks as the story goes from the upper levels towards the very center of the planet," he added.

To achieve just the right underwater look, Branit and the Digital Muse staff took a field trip. "One night, they went diving to get some references on bubbles," Moore said. They also drew on a long Digital Muse history of churning up binary brine. "That stuff was pioneered when we did the *Titanic* mini-series," Branit said. "People think it's the most realistic water they've seen with LightWave." Muse also created an ocean of blood for this season's premiere of *X-Files*. "We just pull it out of our library and make a few adjustments."

Branit did reveal one of Muse's deep sea secrets. "It helps being right here by the ocean. We just take a walk by the beach two blocks down and do our research."

Though perhaps some of that salt water got in Branit's eyes. He admitted, "I was actually pleasantly surprised by the Emmy nomination. By the time you finish a show, you get so close to it that you really have no concept of how good it is."

Moore, who also is a diver, is more definite about the experience, "We had wonderful images from Digital Muse and we did some great compositing work at Digital Magic. We ended up with a show that, in my opinion, is the best looking show we ever did. It should have won the Emmy."

...and a Bag of Baking Soda
THE MAKING OF TIMELESS

by Robert Bonchune

It was the Fall of 1998, the new *Star Trek: Voyager* season was in full swing and we were about to begin the 100th episode *Timeless*. Our supervisor, Mojo, had reached his limit of work load and so I was offered a promotion. I enthusiastically, and rather naively, said "Yes!" - Mojo just laughed. I didn't realize why, until I was in too deep.

Into A Straight Forward Project

Timeless started out as an easy episode for me. All the sequences were relatively straight forward - except the Snow Crash, but that was to be handled by another company. I had a great team to work with, so although it was my first project as a supervisor, I was confident we'd do a great job.

I took on the task of preparing the Delta Flyer for the sequences that were to take place in the future. This involved dirtying up the image maps using a LightWave plug-in called Disgust [Worley Laboratories]. This is a wonderful tool for random aging and pitting of surfaces. I also refurbished the maps for the Galaxy-class Starship that was to become the USS Challenger. A lot of time was spent getting the right specular and diffuse breakup of the surface, and tuning the interactive light on the ship to feel realistic - interactive lights from spots, engine glows, windows, etc. really give a CG model the feel of something real.

Pour Two Cups of Reality

The show was moving along well when Mitch Suskin, the Star Trek Supervisor, asked if we could handle the Snow Crash sequence. We accepted the challenge, but it wasn't long before the reality of how big a job it was sunk in. Steve Burg and Dan Curry had storyboarded the sequence, which called for the Voyager to enter the atmosphere (for which Pj Foley built a CG snow planet), clip a mountain, crash into the snow covered ground, and slide out into the camera. Although the scene contained many challenges, only the creation of the snow plumes were an unknown, in terms of how the scene was going to be done.

And A Bag Of Baking Soda

With only two and a half weeks left to complete the show, we had to decide quickly if an all CG solution was feasible. Our tests seemed promising, but we decided that the practical element method would be the best way to go. John Allardice and Emile Smith took over that part of the process. It was like an old time model shop in the back of Foundation. Using baking soda and air jets, they filmed multiple elements in front of a green screen. Many people assisted, including Ron Thornton since this used to be his area of expertise.

Then Bake At 75°F For 17 Days

Meanwhile, back in the computer freak area, the rest of us were hard at work getting the landscape and lighting to work. John Teska was building the landscape, while I worked hard on getting the lighting assembly to work for all the shots, and doing the Clip A Mountain sequence. The actual crashing was animated by John Allardice. The nacelle getting hit and exploding was handled by Kevin Quattro, and the exposed nacelle built by Koji Kuramura. The final slide out shot was animated by Emile Smith.

We used the filmed snow elements in all of the sequences - mapping them onto polygons and meticulously placing them in their proper positions. We always had to make sure no polygons intersected the Voyager in a noticeable way. This was achieved mostly through transparency maps and careful placement. Our wonderful compositing department, led by Sherry Hitch, handled the green screen processing of the individual elements. They did a great job considering how crude some of the elements were. It was quite the team effort overall. Needless to say there were a lot of late nights.

Serve Hot

In the end, for the amount of time we had, I think the sequence was fantastic. I wish we could have had more time, but I am very happy with the way it turned out. I think the highest compliment given to me and the whole crew was when the Executive Producer, Brannon Braga, said he watched it over and over and just loved it. What better a compliment than that!

Robert Bonchune is an Emmy awarded Supervising VFX Animator at Foundation Imaging.
You can email him at rob@foundation-i.com

OUR NEW
EXPANDED
LOCATION

B&H

PHOTO - VIDEO - PRO AUDIO

420 9th Ave.

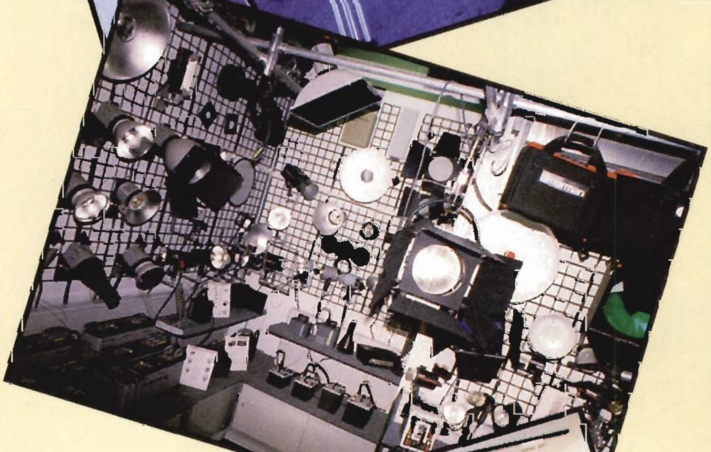
Between 33rd & 34th Streets
New York, N.Y. 10001

Store and Mail Order Hours:
Sun. 10-5, Mon. thru Thurs. 9-7
Fri. 9-1, Sat. Closed

For Orders Call:
800-947-9938
212-444-5038

or FAX (24 Hours):
800-947-9003
212-444-5001

On the Web:
www.bhphotovideo.com
We Ship Worldwide



FOR A FREE MONTHLY CATALOG, CALL 800-947-6933, 212-444-6633 OR WRITE

B&H

PHOTO - VIDEO - PRO AUDIO

"THE PROFESSIONAL'S SOURCE"

FOR ORDERS CALL:
800-947-9938
212-444-5038

OR FAX (24 HOURS):
800-947-9003
212-444-5001

Store & Mail Order Hours:
Sunday 10-5
Monday thru Thursday 9-7
Friday 9-1 • Saturday Closed

On the Web: http://www.bhphotovideo.com

420 Ninth Ave. (Bet. 33rd & 34th St.) New York, N.Y. 10001

QUICK DIAL 74

SONY

DCR-PC100

With the introduction of the DCR-PC100 Digital Handycam camcorder, Sony has introduced the first Mega-Pixel CCD imager.With 1070k Pixels, the PC100 has the ability to produce stunning digital video and still image quality never before offered before in a consumer camcorder. When shooting video, the DCR-PC100 is capable of producing a horizontal resolution of over 500 lines. When using the Digital Still Image feature, the Memory Stick equipped memory mode in the PC100 allows a large, 1152 x 864 image size.

Audio/Video Performance
- Digital Video Recording
- 1st Mega-Pixel CCD DV Handycam Camcorder (1070k Pixel)
- Over 500 Lines of Horizontal Resolution
- Memory Mode with Memory Stick digital storage media
- High Quality 1152 x 864 still image resolution
- Advanced "HAD" CCD technology
- Professional Quality Carl Zeiss Lens
- 10X Optical/120X Digital Zoom
- NightShot 0 Lux with Slow Shutter

Editing
- i.LINK DV Interface

Power Management
- Stamina Power Management 6.5 Hours
- InfoLithium Battery w/AccuPower meter system

Convenience
- Analog Recording Inputs
- Serial Port Connection (RS232C)
- LaserLink wireless transmitter system
- 2.5" Color LCD Display • Color Viewfinder
- Intelligent Accessory Shoe

Special Features
- Progressive Shutter System

DCR-TRV900 3-CCD DV Camcorder

- Three CCDs with 380,000 pixels each for excellent color fidelity and higher S/N ratio
- Progressive Scan CCD delivers clean edges and an overall sharper picture for still images
- 12X optical and 48X digital zoom lens
- 4-lux minimum illumination
- Analog recording capability lets you record from analog sources like Hi8 & S-VHS and master onto DV cassettes
- Zebra pattern indicator for over exposure, and color bar generator for properly adjusting your monitor
- Interval and frame recording for single frame recording and time-lapse effects
- Up to 8 hours recording time with optional NP-F950 InfoLithium Battery
- Crystal clear still/slow motion playback
- Intelligent accessory shoe provides synchronized operation of lights and microphones, automatically
- LaserLink system provides wireless connection of up to 16-feet between the camcorder and TV (requires optional IFT-R10 receiver)
- 5-mode Program AE for proper exposure in a variety of situations: Aperture priority, Shutter Speed priority, Sports Lesson, Sunset & Moon, Low Lux

Memory Mode:
- Memory mode allows you to capture still images and save them to a floppy disc (with supplied adapter), or an optional Memory Stick. You can also automatically copy all of your still images from your mini DV cassette tape directly to a floppy disk (w/supplied adapter)
- Capture images in JPEG file format with a choice of three different quality modes: Standard, Fine, and Super Fine. Save in JPEG format where they can be viewed on any Mac or PC. When you open the images, you will see large 640 X 480, 24-bit color detailed shots
- Date/Time stamp automatically writes the date and time to the file information
- Delete/Protect function allow you to save your favorite shots or delete undesirable ones
- Continuous record mode allows you to capture 4 shots successively in just a few seconds
- Index mode lets you preview six thumbnails at a time. Create a slide show of your favorite shots for playback

Canon

XL-1 3-CCD Camcorder with Interchangeable Lens Mount

With 3-CCDs, exclusive interchangeable XL Lens Mount System, unmatched optical technology, SuperRange Image Stabilizer, DV and simultaneous four channel audio recording, the XL-1 offers unmatched image quality and shooting versatility.

Interchangeable XL Lens Mount System
- Interchangeable XL lenses for unsurpassed flexibility and multi-coated optics to achieve 600 lines of resolution.

16:1 Optical Zoom with SuperRange Image Stabilizer
- The 16:1 has a focal length range of 5.5 to 88mm (35mm equivalent of 39 to 633mm). It offers variable speed zoom, manual zoom and manual focus control and has a one-push auto-focus button and built-in 1.5X ND filter.
- The SuperRange Optical Image Stabilizer uses a motion vector to examine the image after it is received by the CCD to detect any shake.

Digital Audio
- Three digital audio modes (16 bit and two 12 bit modes) and simultaneous recording of four separate tracks. You can output each signal independently.
- Audio inputs with independent level controls.

3-CCDs
- Three 270,000 pixel CCDs with advanced Pixel Shift technology achieves 530 lines of resolution.
- Large 72 micron CCDs deliver a 4dB improvement in sensitivity.

Three Recording Modes:

Unique Design & Dual Action Carrying Handle

Additional Features:
- 180,000-pixel color viewfinder
- Automatic and manual white balance, gain (five preset levels from -3 to +12dB) and exposure lock.
- Zebra pattern and color bar generator
- Composite, S-Video output, DV (IEEE 1394) in/out, Control L
- Digital fader and wide screen TV effect
- Headphone jack with level adjustment
- Remote control with jog/shuttle dial

NEW!

GL-1 The First Digital Video (DV) Camcorder with PRO L-Series Fluorite 20X Zoom Lens

Encompassing the design characteristics of a consumer camcorder with its compact size and 2.5" flexible LCD view screen, color viewfinder, the GL1 is also equipped with much of the same functionality that attracts newscasters and independent filmmakers. By extending broadcast-quality DV technology to prosumers, Canon is bringing high-quality video production capabilities to homes and small businesses. For users interested in visual computing, this FireWire IEEE 1394 compatible camcorder is ideal for producing QuickTime movies and creating images for distribution via the Internet.

- Professional L-Series Fluorite Lens - a material that provides outstanding resolution, contrast and color reproduction and minimizes color aberration, especially in high-magnification lenses.
- 20X Optical Zoom - At a 35mm focal length equivalent of 40 - 806mm, the 20X optical zoom transforms distant subjects into, dramatic close-ups.
- 100X Digital Zoom-capable of extending between 40X-100X. At full telephoto, the 35mm focal equivalent is 80-600mm.
- Optional WD-58 Wide-converter - will increase by 0.7X, 28mm in 35mm focal equivalent, for indoor shots or panoramic views.
- Optical Image Stabilization - eliminates image shake due to a wide range of movement and/or high wind conditions.
- Three Shooting Modes -Frame Movie mode allows users to record high-speed action at 30 fps. - Normal Movie mode delivers more than 500 lines of resolution - Digital Photo mode, with self timer, captures more than 700 still frame images on a single 80-minute cassette in SP mode. For SLR-style flash photography, the digital photo mode will accommodate a selection of Canon's speedlight flashes, including the 220EX, 380EX or 550EX.
- Direction Accurate Microphone.
- Programmed AE - Offers seven advanced recording controls -Full Auto Green Zone -Auto Mode -Manual Mode -Spotlight -Sand & Snow -Shutter Priority/Aperture Priority
- Picture Adjustment Supports -Camera Sharpness adjusts picture sharpness before recording.

Panasonic

Broadcast & Television Systems

AG-EZ1 3-CCD Digital Video Camcorder

- Digital recording delivers 500 lines of horizontal resolution with no noise. (S/N ratio is 54dB).
- 10:1 power and 20:1 digital zoom lens. Both zooms are adjustable in four speeds (3.5-15 sec.) For extreme close-ups the lens can focus up to 1/4" from the subject.
- Two digital audio modes, choose between two-channel 16-bit stereo recording or two sets of 12-bit stereo.
- Huge 1.5" 180,000 pixel color viewfinder with 400 lines of resolution displays all functions on demand.
- Digital Electronic Image Stabilizer (DEIS) compensates for jittery video. Particularly effective when the digital zoom is employed.
- Variable speed shutter from 1/60—1/8000 of a second
- Built-in SMPTE time code generator.
- Digital Photo-Shot lets you record a still-frame for six seconds, while audio continues as normal. 290 still pictures can be recorded on a single 30-minute tape. TopScan function finds any shot easily.

$1695

AG-EZ30 World's Smallest 3-CCD Camcorder w/IEEE1394 Interface

The AG-EZ30 combines 3-CCDs and the DV format to deliver a level of picture and sound quality that makes it one of the most advanced camcorders of its kind. Weighing just 1.5 lbs. this incredibly lightweight camcorder also incorporates a large 2.5-inch color LCD monitor and has a host of sophisticated auto functions as well full manual control when required.

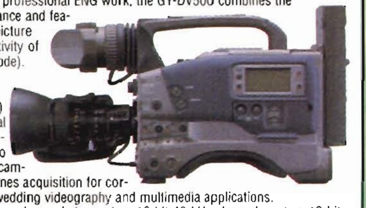
- 3-CCDs (270,000 pixels each) with a large light-collecting area give the camera high sensitivity and wide dynamic range. Double-density pixel distribution and a gapless dichroic prism further ensure razor-sharp images and extremely faithful color reproduction.
- Selectable 2-channel 48 kHz/16-bit or 4-channel 32 kHz/12-bit PCM audio recording.
- Built-in stereo mic and external mic input as well.
- 180,000 pixel, 2.5-inch color LCD monitor. Also has a 0.5-inch color viewfinder.
- Digital Image Stabilizer for clear, shake and jitter free shots.
- 12X optical zoom as well as 30X and 120X digital zoom functions. Move from wide-angle to full zoom in 1.3 seconds allowing quick framing while in REC pause.
- Offers six digital effects: Wipe, Mix, Strobe, Gain-Up, B&W and still mode.
- Large-diameter focus ring enables a high level of focusing precision. A Multi-Function Push Dial allows easy setting of the 16-step iris, 5-step gain control (+12dB maximum) and 14-step shutter (up to 1/8000 second). Mic input level can also be set in steps (-20/-10/0/+3/+6 dB).
- Five program AE modes for shooting in a variety of different conditions. There is also a five-mode white balance: Set , Fluroescent, Auto, Indoor and Outdoor.

NEW!

JVC

GY-DV500 1/2-inch 3-CCD Professional DV Camcorder

The world's first DV camcorder designed from the ground up for professional ENG work, the GY-DV500 combines the convenience and cost-effectiveness of Mini DV with the performance and features you need. It incorporate three 1/2-inch CCDs for superior picture performance (equivalent to 750 lines of resolution) superb sensitivity of F11 at 2000 lux and minimum illumination of 0.75 lux (LoLux mode). Ruggedly constructed with a rigid diecast magnesium housing providing the durability professionals crave, the GY-DV500's compact design and light weight (lesss than 11 lbs. fully loaded) makes it extremely portable. Additional features like the menu dial and Super Scene Finder assure ease-of-use and shooting flexibility, while the IEEE1394 and RS-232 interface allow integration into various non-linear and post-production systems. A professional camcorder in every sense, the compact, lightweight GY-DV500 redefines acquisition for corporate, educational, cable and broadcast production, as well as wedding videography and multimedia applications.



Professional Specifications

- Applies JVC's DSP with advanced 14-bit video processing to bring out more natural details, eliminate spot noise, accurately reproduce dark areas, and restore color information in dark areas.
- Three high-density 1/2" 380,000 pixel IT CCDs ensure the best possible image quality.
- CCDs are equipped with advanced circuitry to virtually eliminate vertical smear when shooting bright lights in a dark room. Ensures efficient light conversion with a sensitivity of F11 at 2000 lux.
- CCD Defect Correction function evaluates white defects with the lens closed and then stores their addresses in memory When the camera is turned on, the data is sent to the DSP for storage and real-time correction.
- Black Stretch/Compress function ensures accurate reproduction of black areas on the screen. Advanced color matrix circuits give even difficult images a very natural appearance.
- Multi-stream parallel digital pipeline processing at 40 MHz creates an ultra-smooth gamma curve, calculated using a true log scale algorithm. The result is a dynamic range of 600% to accurately reproduce fine details and colors in shadows or highlights.

Professional Performance

- When activated, the Lolux mode increases sensitivity with almost no increase in noise. Lolux lets you capture high-quality video footage with excellent color balance at just 0.75 lux minimum illumination.
- Multi-zone iris weighting system gives priority to objects at the central and lower portions of the picture for accurate auto exposure under any condition, even if a bright subject moves into the picture.
- Adjustable gamma for adjusting the "feel" of the picture according to taste. Adjustable detail frequency for setting picture sharpness for a bolder or finer look.
- Viewfinder status display uses characters and menus to diplay selected information, including audio indicator, tape and battery remaining time, VCR operation and warning indicators. Camera settings and setup parameters can also be checked at a glance. A built-in menu dial lets you quickly navigate through the viewfinder menu.
- Highlight Chroma Processing maintains color saturation in highlights. The result is natural color reproduction, even in bright highlight portions of the picture.
- Smooth Transition mode ensures a smooth transition with no jump in color or light level taking place when manually changing gain or white balance settings

Professional Audio

- To complement its superior video performance, the GY-DV500 offers outstanding digital PCM sound. You can choose between two 16-bit 48-kHz channels or two 12-bit 32-kHz channels with a dynamic range of 85 dB.
- In addition to camera mounted mic, has two XLR-balanced audio inputs with 48v phantom power and manual audio control.Phantom power can be switched off when not in use.
- Side-mounted speaker lets you monitor audio in playback and recording modes without headphones. The speaker also delivers audible warnings

Compact and Lightweight

- Measuring 10-7/8 x 9-11/16 x 5-1/8 the GY-DV500 amazingly enough is almost half the size of the GY-X2B. Weight is carefully balanced for ease of use in an ENG environment and extended shooting
- Consumes less than 20 watts of power, eliminating the need for cumbersome and heavy, large-capacity battery packs.

Automatic Functions

- Full Auto Shooting (FAS) mode for point-and-shoot ease of operation. You simply zoom and focus. Activating the Full Auto Shooting sets the camera to the Auto Iris Mode, even if the lens is set to manual. Automatic videolevel control (ALC) is also activated, along with Extended Electronic Iris (EEI) and Full Auto White, which provide both variable gain and variable shutter. Shoot continuously from a dark area to a bright area without changing Gain, Iris or ND filter.
- ALC (Automatic Level Control) with EEI (Extended Electronic Iris) for continuous shooting in all light levels — no need to switch gain settings or ND filter.
- Continuous Auto Black (CAB) circuit assures perfect Black Balance in a changing environment without having to interrupt shooting.
- Accu-Focus activates the electronic shutter for approximately ten seconds, forcing open the Iris. A s a result, the depth of focus is minimized, and the lens can be focused quickly and precisely.

Conveniences

- Time code and index IDs allow frame accurate non-linear editing and mastering on standard formats with quick easy access to any target point.
- LCD display system let you switch or set functions, while referring to the counter or the on-screen display. Mode selection and initialization are also available via the menu display. Back-lit display supports shooting in dark areas.
- Back tally lamp lights to let you know that the camera is entering the Record mode. It flashes during the transition to the Record mode and when an error is detected in the camera.
- Variable Scan function allows flicker-free shooting of computer monitors. Shutter speeds can be set from 1/60.5 to 1/196.7 of a second in 255 increments to precisely match the scan rate of the monitor.
- Tape/Battery Remaining indicator means you always know exactly how much tape and battery power remains.

SEVEN DAY CUSTOMER SATISFACTION GUARANTEE

Web # 307

QUICK DIAL 74

SONY

DSR-PD100 3-CCD Mini DVCAM Camcorder

The smallest DVCAM camcorder, the DSR-PD100 is also the first one with built-in image capture capability. The highly compact camcorder features three 1/4" 380,000 pixel CCDs that allow two scanning modes: 480 progressive (for stills) or interlaced (for video).

- Three 380,000 pixel CCDs complement DVCAM with a high standard of quality for this class of camera. DVCAM offers superior video and audio quality, and reliability for professional use
- The CCD's can be switched to scan in two ways: Interlace Scan for recording moving images and Progressive Scan for recording still images
- Super SteadyShot compensates for unwanted camera movement without reducing image quality
- A built-in 12X zoom lens is supplemented by a 48X digital zoom that can provide really close up shots
- Manual control of focus, gain, white balance and shutter speed. Also has full automatic control
- i.LINK interface provides a single cable connection to transfer digital video and audio
- Records PCM digital stereo sound in both 48 kHz mode (16-bit) and 32kHz mode (12-bit). When a recording has been made in 12-bit mode, another stereo channel can be added later
- The DSR-PD100 has a 3.5" color LCD monitor with 184,000 pixels, opening 90° to the side and swiveling 180°. Also has a 180,000 pixel color viewfinder.
- Can record still images on both tape or removable media, such as Memory Stick
- Start/Stop/Zoom of the camcorder and VTR operation, plus slow playback or search can be controlled by the supplied wireless remote commander
- Supplied XLR adaptor attaches onto the hot shoe of the camcorder, allowing external professional microphones to be connected to provide high quality audio sources. Through XLR adaptor, DC power (+48V for a microphone is also supplied from the DSR-PD100
- A 0.7X wide conversion lens is supplied, complete with lens hood, lens cap and protective bag
- Includes 4 MB Memory Stick & Memory Stick/PC Card Adaptor
- Weighs just 1kg (2.2 lbs) with a battery and a tape. A magnesium alloy die cast body keeps it light but robust

DSR-200A 3-CCD Digital (DVCAM) Camcorder

Combining a compact and lightweight body with the superior picture quality of DSP (Digital Signal Processing) and the DVCAM format, the DSR-200A is the ideal acquisition tool for video journalists, event and wedding videographers, stringers and production houses. 500 lines of horizontal resolution, 48kHz or 32kHz digital audio, three hour record time, and minimum illumination of 3 lux is only the beginning. Other features include 16:9/4:3 capability, Steady Shot, high resolution 1-inch viewfinder, time code operation, time/date superimposition and an IEEE-1394 interface for direct digital output. Offers full automatic as well as manual control of focus, iris, gain, white balance and shutter speed.

- Variable servo 10X optical power zoom lens goes from 5.9 to 59mm in 1.7 to 24 seconds. The manual zoom rocker is continuously variable right up to where the digital 20X zoom kicks in.
- Sony's Super Steady Shot reduces high frequency camera shake without compromising image quality. SteadyShot uses horizontal and vertical motion sensors that allow it to work accurately while zooming, moving (even shooting from a car), and shooting in low light conditions.
- Has digital effects including audio and video fade, overlap and Slow Shutter.
- Automatic and manual focus, iris, shutter, gain and white balance. Iris is adjustable in 12 levels from F1.6 to F11, shutter from 1/4 to 1/10,000 of a second in 12 steps. Gain from -3dB to +18dB in 8 steps.
- Zebra Pattern indicator, bult-in ND filter.
- Custom Preset function lets you preset, store and recall custom settings for color intensity, white balance (bluish or reddish), sharpness and brightness.
- Stores Photo, Date/Time, Shutter Speed, Iris, Gain and F-stop for easy recall. So if you have to re-shoot, you know your original settings for every scene and frame.
- Records Drop/Non-Drop Frame time code. Time code can be read either as RC time code or as SMPTE time code
- Has a large 1-inch B&W viewfinder with 550 lines of resolution for easy focusing even in low contrast lighting situations. Separate information sub panel displays time code, battery time, tape remaining and other camcorder functions without cluttering up the viewfinder.
- Records 16-bit/48kHz audio on one stereo track or 12-bit/32kHz with two pairs of stereo tracks (L1/R 1, L2/R2), so you can add stereo music or narration.
- One-point stereo electret condenser mic for clear stereo separation. Directivity can be selected from 0°, 90° & 120°.
- Automatic & manual (20-step) audio level record controls. Monitor audio with headphones or from the LCD panel which has an active VU meter.
- XLR input connectors for mics and audio equipment.

DSR-20/40 DVCAM Player/Recorders

The DSR-20 and DSR-40 are versatile DVCAM VCRs with compact chassis' and a variety of convenient functions for recording, playback and simple editing. They feature Auto Repeat Playback, Power-On Recording/Playback, multiple machine control interfaces and i.Link (IEEE1394) input and output. And, of course, they offer the stunning image and sound quality inherent to the DVCAM format.

i.LINK

- They both offer i.LINK ((IEEE1394) input and output. In addition, in the "Digital dubbing including TC Copy" mode, full information of video, audio and time code of the original tape can be copied to another tape. Especially useful when making working copies of the original.

Inputs and Outputs

- They provide a full range of analog video inputs and outputs for integration into current analog-based systems. They both offer composite and S-Video input/output, while the DSR-40 (only) offers a component output as well. The DSR-20 is equipped with analog audio inputs and outputs (RCA), the DSR-40 with RCA inputs and XLR-balanced output. These connections in combination with their i.LINK interface allow a smooth transition to an all digital system in the future.

Record/Playback Functions

- Automatic repeat function for repeated playback. After reaching either the end of the tape, the first blank portion or the first index point, the DSR-20/40 automatically rewinds the tape, then starts playing back the segment again.
- They are capable of searching for Index Points, which are recorded on the tape as "in-point" marks every time a recording starts. They can also search for photo data recorded on a DVCAM cassette by the DSR-200A/300/PD-100, or where the recording date has been changed.

Reference Input

- External sync input enables synchronized playback with other VCRs. Especially important in A/B Roll configurations. In addition, the DSR-40 only allows adjustment of H-sync and SC phase via the menu.

Control S Interface

- The DSR-20/DSR-40 have a Control S input allowing control via the optional DSRM-20 Remote Control.
- The DSR-20 adds a Control S **output** connector allowing two or more (up to 50) DSR-20s to be daisy-chained and controlled from one DSRM-20.

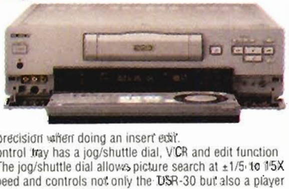
DSR-20 Only

- The DSR-20 can be powered by AC or DC.
- Equipped with Control L interface, the DSR-20 can perform simple Time Code-based editing when connected to another DSR-20 or other similarly equipped VCRs/cameras.
- In addition to Control L, the DSR-20 also incorporates an RS-232 interface for remote control of basic VCR functions from a PC.
- Supplied with the RMT-DS20 Wireless Remote for control of basic VCR functions.

DSR-40 Only

- Equipped with an RS-422A interface, the DSR-40 can perform as the editing player in A/B roll or cut editing system.
- It also has a simple recording function which can be controlled either manually or via its RS-422A interface.
- The DSR-40 is not equipped with a synchronization capability, the editing accuracy is performed by pre-roll and play.

DSR-30 DVCAM Digital VCR



The DSR-30 is an industrial grade DVCAM VCR that can be used for recording, playback and editing. DV standard 4:1:1 sampling digital component recording with a 5:1 compression ratio provides spectacular picture quality and multi-generation performance. It has a Control L interface for editing with other Control L based recorders such as the DSR-200A DVCAM Camcorder or another DSR-30. It also has a continuous auto repeat playback function making it ideal for kiosks and other point of information displays. Other features include high quality digital audio, IEEE-1394 Digital interface and external timer recording. The DSR-30 can accept both Mini and Standard DVCAM cassettes for up to 184 minutes of recording time, and can playback consumer DV tapes as well.

- Records PCM digital audio at either 48kHz (16-bit, 2 channel) or at 32kHz (12-bit 4 channel).
- Equipped with Control L, the DSR-30 is capable of SMPTE Time Code based accurate editing even without an edit controller. Built in editing functions include assemble and separate video and audio insert.
- By searching for either an Index point or Photo Data recorded by the DSR-200A camcorder, the DSR-30 drastically cuts the time usually required for editing. The DSR-30 can record up to 135 Index points on the Cassette Memory thanks to its 16K bits capability.
- Audio lock ensures audio is fully synchronized with the video for absolute precision when doing an insert edit.
- Built-in control tray has a jog/shuttle dial, VCR and edit function buttons. The jog/shuttle dial allows picture search at ±1/5 to 15X normal speed and controls not only the DSR-30 but also a player hooked up through its LANC interface
- DV In/Out (IEEE 1394) for digital dubbing of video, audio and data ID with no loss in quality.
- Analog audio and video input/outputs make it fully compatible with non-digital equipment. Playback compatibility with consumer DV tapes allows you to work with footage recorded on consumer-grade equipment. Tapes recorded in the DSR-30 are also compatible with Sony's high-end DVCAM VCR's.

QUICK DIAL 72

SONY

UVW-1200/UVW-1400A

Betacam SP Player • Player/Recorder

The UVW-1200 and UVW-1400A are non-editing VCRs which deliver Betacam SP quality and offer features for a wide range of playback and recording applications. RGB and RS-232 interface make them especially ideal for large screen, high quality video presentation, scientific research and digital video environments.

- Ideally suited for work in computer environments, because RGB signals can be converted into component signals and vice versa with minimum picture degradation.
- 25-pin serial interface allows external computer control of all VCR functions based on time code information. Baud rate can be selected from between 1200 to 38,400 bps.
- Built-in Time Base Stabilizer (TBS) locks sync and subcarrier to an external reference signal as well as providing stable pictures. High quality digital dropout compensator further ensures consistent picture performance.
- Equipped with two longitudinal audio channels.
- Both read LTC Time Code) and UB (User Bits). The UVW-1400A also generates LTC and UB (Free-Run/Rec-Run).
- Auto repeat of entire or a specific portion of the tape.
- Built-in character generator can display VTR status, time code, self-diagnostic messages, set-up menu, etc.
- Control of jog, shuttle, playback, record, pause, FF and REW with the optional SVRM-100A Remote Control Unit.
- Composite and S-Video as well as component via BNCs which are switchable to RGB output. The UVW-1400A has two switchable sync connectors and a Sync on Green.
- Built-in diagnostic function and hour meter.
- Initial set-up menu for presetting operational parameters. Settings are retained even after power is turned off.

UVW-1600/UVW-1800

Betacam SP Editing Player • Betacam SP Editing Recorder

The UVW-1600 and UVW-1800 are the other half of the UVW series. They offer the superiority of Betacam SP with sophisticated editing features. They feature an RS-422 9-pin interface, built-in TBCs and Time Code operation. Inputs/outputs include component, composite and S-Video. **All the features of the UVW-1200/1400A *PLUS*—**

- Optional BVR-50 allows remote TBC adjustment.
- RS-422 interface for editing system expansion.
- Two types of component output; via three BNC connectors or a Betacam 12-pin dub connector.
- Frame accurate editing is assured, thanks to sophisticated servo control and built-in time code operation. In the insert mode of the UVW-1800, video, audio Ch-1/2 and time code can be inserted independently or in any combination.

PVM-14M2U/14M4U and 20M2U/20M4U

13-inch and 19-inch Production Monitors

Sony's best production monitors ever, the PVM-M Series provide stunning picture quality, ease of use and a range of optional functions. They are identical except that the "M4" models incorporate Sony's state-of-the-art **HR Trinitron** CRT display technology and have SMPTE C phosphours instead of P22.

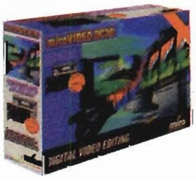
- HR Trinitron CRT enables the PVM-14M4U and 20M4U to display an incredible 800 lines of horizontal resolution. The PVM-14M2U and 20M2U offer 600 lines of resolution. M4 models also use SMPTE C phosphours for the most critical evaluation of any color subject.
- Dark tint for a higher contrast ratio (black to white) and crisper, sharper looking edges.
- Each has two composite, S-Video and component input (R-Y/B-Y, analog RGB).For more accurate color reproduction, the component level can be adjusted according to the input system. Optional BKM-101C (video) and BKM-102 (audio) for SMPTE 259M serial digital input.
- Beam Current Feadback Circuit
- 4:3/16:9 switchable aspect ratio.
- True multi-system monitors they handle four color system signals: NTSC, NTSC 4.43, PAL, and SECAM.
- External sync input and outputcan be set so that it will automatically switch according to the input selected.
- Switchable color temp: 6500K (broadcast), 9300K (pleasing picture), User preset.(3200K to 10000K).
- Blue gun, underscan and H/V delay capability
- On-screen menus for monitor adjustment/operation.
- Parallel remote control and Tally via 20-pin connector.

QUICK DIAL 731

PINNACLE SYSTEMS

miroVIDEO DC-30 *PRO*

PCI Capture Card for Windows 95/NT



Pinnacle Systems' miroVIDEO DC30 Pro is the ideal solution for creating professional quality video productions. If you create corporate, commercial, wedding, event, multimedia or Internet videos, the high-powered software bundle and state-of-the-art hardware of the miroVIDEO DC30 Pro gives you unbeatable results. Includes Pinnacle Systems' powerful TitleDeko character generator plug-in for Adobe Premiere 5.1. Add creative, custom titles to your video productions with Emmy Award-winning technology. Use the full version of Adobe Premier 5.1 to capture, edit and output professional quality productions for video, multimedia, and the web with . Also includes 300 unique Pixélan Software Video SpiceRack transitions and a high quality video and audio breakout box. The breakout box allows for convenient placement of connections on your desktop.

- 2.4:1 compression ratio for a better final video image quality. Compression ratios under 4:1 are considered to be "broadcast quality."
- Full NTSC, PAL, SECAM, for worldwide compatibility.
- Real-time video overlay on the computer monitor eliminates the need for an external video monitor.
- Professional breakout box brings your connections up front and easily accessible

Bundled Software:

- Full version of Adobe's Premiere 5.1 editing software gives you powerful editing tools to create professional productions
- Bring Hollywood-quality graphics to your video productions with TitleDeko. Easily add amazing titles to all of your video productions. Titles can fade up, scroll and even blend with pictures. Apply glows, neon and metallic looks, textures, shadows and shapes to your titles with any TrueType font.
- Pixelan Software's Spice Rack gives you over 300 transitions to choose from.
- Sonic Foundry's Acid Music software lets you create royalty-free music for your productions.
- MiroINSTANT Video saves time and disk space with accelerated, intelligent rendering. When rendering and playing your final production, miroINSTANT Video overcomes the 2Gb AVI file size limitation, allowing you to quickly put more video directly onto tape – in one pass.

DC-30 *PRO*	649.00
NEW! DC-50	1599.00

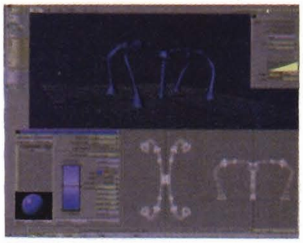
MiroVIDEO DC-30 *PRO* Turnkey System:

• 220-watt midtower case • Pentium 233 MHz MMX processor • PCI motherboard with 512K cache • ATI XPert-128 8MB PCI display card • 128MB of RAM • Quantum 3.2 GB IDE system drive • Seagate (Barracuda) 9GB SCSI-2 FAST/Ultra-wide hard drive • Initio 91004W Fast/Wide SCSI 2 controller • 3.5" floppy drive • Teac CD-532E 32X EIDE internal CD-ROM drive • Altec-Lansing ACS-43 2-piece speaker system • Focus 2001A keyboard • Microsoft MS mouse • Viewsonic GS771 17" 1280 X 1024 SVGA monitor • Windows 95 • MiroVIDEO DC-30 *PRO* video/audio capture card • Adobe Premiere 5.1 (full version) editing software, TitleDeko, Pixelan Software Spice Rack, Sonic Foundry Acid Music $2495.00

NewTek LightWave [6]

3D Animation, Modeling and Rendering Software

Explosive ideas that test the boundaries of 3D animation deserve a program that can realize them in exciting new ways. Creating worlds that no one's ever seen. Creatures that have never walked the Earth. Special effects, games, web sites - all creations that exist only in your mind. Until now............



The culmination of over ten years of development, LightWave [6] advances the state-of-the-art in professional 3D animation by adding a comprehensive set of groundbreaking character animation tools, advanced rendering capabilities, a new and improved architecture and a refined work environment. The three traditional areas of 3D, modeling, animating and rendering, have received massive enhancements in the new software. Among the thousands of changes in this completely redesigned system, LightWave [6] boasts real-time subdivision surfaces as a modeling and animation tool, radiosity, caustics, 160-bit floating-point rendering, a hybrid Inverse/Forward Kinematics engine and new character-animation technologies: LightWave, the recognized leader in the film and television industry, provides the most complete feature set of any 3D animation tool available—one of the reasons you can find LightWave 3D in more Hollywood animation suites than any other 3D program. And , LightWave [6] is the only 3D software system to run on Macintosh, Windows NT, Alpha and SGI.

AURA

Powerful Production tool for Animation, Paint and Video Layering

Aura is a one-of-a kind palette of paint tools, compositing, cel animation, special effects, video elements, 2D animation and character generation, Aura blends key features of all of these tools into one superb system. So you can take any digital image... no matter what the source... and add motion, color, 2Dand 3D elements, effects and titles. Throw in rotoscoping, video painting and layering and you can add color and depth to any production. Aura also works seamlessly with LightWave to give you a complete production environment.

Animation, Video and Layering:

- Time-line based animation and video element assembly
- Unlimited layers for stills, animation or video
- Use any frame rate or size for animation, video or web
- Fully animated, full-color brushes
- Keyframe animation and video, motion blur and opacity
- Move any element in x, y or z, heading, pitch or bank space
- Stroke recorder to animate and reproduce brush strokes over time with support for pressure, size and noise parameters
- Complex composite and layered animation
- Real-time overlay and alpha channels for every graphic layer
- Interactive layer rearrangement
- Photoshop layer support and image animation

Drawing, Pen/Brush Control:

- Freehand and polygon shape creations
- Line, spline curve, shape draw with circle, ellipse and rectangle • Filled or outline drawing
- Excellent control of pen, pencil, colored pencil, chalk, crayon, airbrush, watercolor, gouache and oil painting
- Control pen/brush tip, tension, pressure, size, opacity
- Rotoscoping for quick, powerful video painting; draw/paint operations "over time" & animated video brushes "over time"
- Drawing tablet support for Wacom (or compatible) with 256 levels of pressure and speed
- 2400 image processing/drawing combinations
- Text tool supports TrueType fonts and a wide range of text parameters
- Color, chroma, luminance and alpha channel keying

Video Toaster

Tools for Broadcasting and Beyond

With a suite of tools for video creation including all the essential components for video editing, compositing and 2D/3D animation, the Video Toaster is an uncompressed D1 (composite, component, Y/C) Windows NT solution that offers a price/performance equation unmatched in the industry. Unique to the Video Toaster is a breakthrough technology developed by NewTek that turns a standard Pentium II or III processor into a highly specialized video DSP (digital signal processor) for time base correction and other capabilities typically associated with expensive custom chipsets. Superior to systems that cost tens of thousands of dollars the Video Toaster includes LightWave VT 3D animation software, Aura paint and compositing software and in-syncs Speed Razor 4.5 SE video editing software. Leveraging over 12 years of experience as an industry leader and pioneer in the desktop video, 3D, and 2D paint and animation markets, NewTek has created a product that contains award winning tools for creating better than broadcast quality television.....at an unbeatable price!

Uncompressed Video— No Compromises

- The Video Toaster offers quality that's second to none. ALL video is ALWAYS stored in its native, uncompressed D1 video format. Unlike other boards that show compression artifacts, the Video Toaster maintains the original pristine quality no matter how many layers in your project.

- The Video Toaster allows you to manipulate uncompressed video in many ways, including traditional 2D compositing, rotoscoping, 3D animation and modeling and editing. By merging video into a 3D compositing and animation environment, editors will find a new paradigm for video effects and manipulation. The quality and capabilities of the Toaster are comparable or better than digital video editing costing $50,000 to $100,000.
- The Toaster provides an uncompressed D1 (composite, component, Y/C) digital video solution typically associated with extremely expensive systems. High-end facilities know that uncompressed digital video is essential to the editing process. Most compression-based systems are elegated to industrial and corporate video segments due to restrictions on the number of layers and quality degradation associated with multi-pass compression. All compressed systems produce unwanted artifacts. Because the Toaster utilizes uncompressed video, you can infinitely layer video without any concern about artifacts. This is the major separation between high-end and mid range systems. The Toaster brings that ultra high-end sophistication to users at levels at an unprecedented price point.

Powerful Editing

Video Toaster includes in-sync's powerful editing application, Speed Razor 4.5 SE.

- Project timeline that lets you easily create professional video projects containing unlimited layers of video, audio, still image files and animation
- Comprehensive 2D compositing system
- The ability to capture, edit and output to uncompressed video and other formats, including ASF for video streaming on the Web and multimedia AVIs.
- Graphical workspace for digital media content management
- Real-time on-screen preview of edits
- Power character generator (CG).

Toaster Utilities

VT Director—Allows any program that supports cut and paste to display an image on a NTSC or PAL video monitor. Imagine working in Photoshop and being able to display your work on a video monitor with one keyboard shortcut

ToasterVision—Allows you to preview both video input and output as well as animation on your RGB monitor at 720 x 480 resolution and full frame rate—60 fields per second

ToasterScope—Keep your video legal as you work on it. The built-in waveform monitor and vectorscope lets you monitor your video input and output.

ToasterKey—Use ToasterKey in Aura to paint in realtime on your video monitor. You can also paint in realtime over live video. Bring frames into Aura from a live input with the frame grabber.

Continuously Upgradeable —Guaranteed Against Obsolesence

The Video Toaster was designed to last for years to come. Similar to the original Video Toaster for Amiga, which is still in production 10 years after its introduction, the Video Toaster utilizes a hardware system that leverages highly tuned software and the systems processor. The true power of the system comes from the proprietary software designed to create magic without the use of expensive video cards or bulky external hardware. By merging software and hardware, the Video Toaster can be upgraded and expanded well beyond current systems. NewTek will be adding modules for a real time 16-input switcher, DV I/O, storyboard editing, and ***real-time*** chroma keying and 3D DVE.

QUICK DIAL 732

VIDEONICS Effetto Pronto

Digital Video Effects and Compositing System for Macintosh

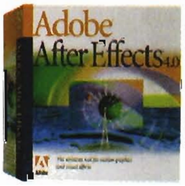
Effetto Pronto is a powerful combination of compositing and effects software, and a dedicated PCI hardware accelerator card. With a keyframe-based timeline compositing interface, Effetto Pronto blends all of the elements you want in your project.: video, graphics, 3D animation and anti-aliased text from the CG module. It even includes an audio track so you can animate to the beat of the music.

- Work with an unlimited number of tracks at any resolution
- Effetto is resolution independent so you can mix and match a variety of formats and seamlessly bring them all together
- Color correction, chroma and luma keying, 3D warps with perspective and 3D animatable lights.
- Advanced character generator offers unlimited text overlap, free-form text positioning, point and click typing, font and color palette thumbnails, drop shadows and glows and much more.
- Provides true 3D perspectives for your work. Any object can be rotated or warped on its X, Y, or Z axis, and can be positioned anywhere in 3D space.

Adobe

After Effects 4.0

The Most Powerful Tool for Compositing, 2D Animation and Special Effects



The industry-standard for professional motion graphics, After Effects is the most powerful tool available for producing high-end, unlimited composites, fluid animations, and sophisticated special effects. After Effects also generates the highest quality output at the desired resolution so it's the ideal design tool for film and video producers and editors, graphic designers, multimedia professionals and Web developers.

- Produce stunning special effects for broadcast, film, video and multimedia right from your desktop.
- Create animations for openers, bumpers, promos, commercials, music videos, titles, games, and more.
- Control layers with stunning precision. Combine unlimited layers of moving and still images.
- Add any number of keyframes, animate and apply special effects to each layer, and adjust those layers until the composite looks and moves exactly as you want.
- Enjoy precise control over every aspect of your composite—from sub-pixel positioning to controlling the shape and velocity of each animation path.

$629.95

ICE Final Effects Complete

Final Effects Complete is a premium set of 60 motion graphics effects' plug-ins for Adobe After Effects which create professional special effects for film, video and other digital video production. Final Effects Complete offers the ability to generate rain, snow, fire, smoke, bubbles, liquid mercury distortions, explosions, 3D particles, liquid displacement and lighting effects, a multitude of stylistic transitions and other video effects.

- 60 Hollywood-style filters and transitions– the same ones used in MTV and Fox promos.
- Full-featured 2-D and 3-D particle system Create rain, smoke, fire, bubbles, ball action, confetti, jet trails, water ripples, cubes, star bursts, hair, liquid mercury blobs, fireworks and more.
- Particle World, an amazing 3D particle system with Z-depth and full camera tilt movement, lets you spray particle objects around your 2D image layers.
- Design unlimited effect combinations with interactive control over subtle compositing details. Effects can be animated over time to add even more sophistication.
- Incredible one-of-a-kind stylistic effects. Burn your image away like melting film. Paint in brush strokes with a glue gun. Scatterize every pixel of an image. Create psychedelic flowing backgrounds and kaleidoscope patterns. Flip your image like a page turning in a book to reveal another image. Materialize an image into glass or a blobby substance over time.
- Dramatic or subtle lighting with spotlights, multi-colored light rays, light sweeps and light bursts. Time controls for echo and motion blurring effects.
- Bend, slant, split, ripple, stretch, tile, twist and crumple your image or movie in an infinite number of ways. Turn them into a movable sphere or cylinder, rotate or manipulate them in any imaginable perspective without destructive clipping. The possibilities are endless.
- Remove tell-tale wires from blue screens. Create alpha maps and sepia tones, composite between effect and source, and even rotate between color values.

QUICK DIAL 731

CTI DISK ARRAYS

for Mac and Windows NT

Video applications need extremely high data throughput to ensure high quality video. Using Ultra SCSI technology and Seagate Ultra SCSI 16-bit disk drives, CTI disk arrays provide high data of up to 80 MB/sec to ensure smooth clean video without dropped frames. Especially designed for audio and video applications, Seagate disk drives employ embedded servo technology, eliminating the need for thermal recalibration.

With a series of disk arrays fully tested for Windows NT and Mac PCI systems, CTI delivers the fexibility, performance and reliability you need at very competitive pricing.

Available in fixed and removable configurations, CTI arrays range from 8 GB to 180 GB per system and up to 1500 GB when daisy-chained.

Among the fastest in the industry, CTI Disk Arrays for Macintosh and PC are ideal for video and pre-press or any other application where absolute speed is essential. All solutions are based on world-proven Seagate Barracuda hard drives, and all feature steel chassis, extra capacity cooling fan, fixed or removable enclosures, push button SCSI selectors and Ultra SCSI performance. All include ATTO express PCI interface card, striping software, cables, active terminators and five year limited warranty.

- AV ready • Raid level 0 for high-speed data striping
- Push button SCSI ID selector
- Includes Seagate FAST Wide Ultra SCSI 16-bit high performance drives
- Incorporates striping software for Mac-based systems
- Uses ATTO single or dual channel PCI Ultra SCSI controller cards
- Multiple large power supplies • Efficient cooling and airflow
- Available in two and four bay towers (fixed and removable)
- All arrays include 5-year limited warranty

2 Bay Tower Fixed

CTI-8FS	8.4GB Array with 2 Seagate Barracuda 4.2GB Ultra Wide drives (#ST34572W) and Single Channel SCSI card (18.2 MB/s sustained transfer rate)	**999.00**
CTI-18FS	18.2GB Array with 2 Seagate Barracuda 9.1GB Ultra Wide drives (#ST39173W) and Single Channel SCSI card (28.2 MB/s sustained transfer rate)	**1585.00**
CTI-36FS	36.4GB Array with 2 Seagate Barracuda 18.2GB Ultra Wide drives (#ST118273W) and Single Channel SCSI card (28.2 MB/s sustained transfer rate)	**2375.00**

4 Bay Tower Removable

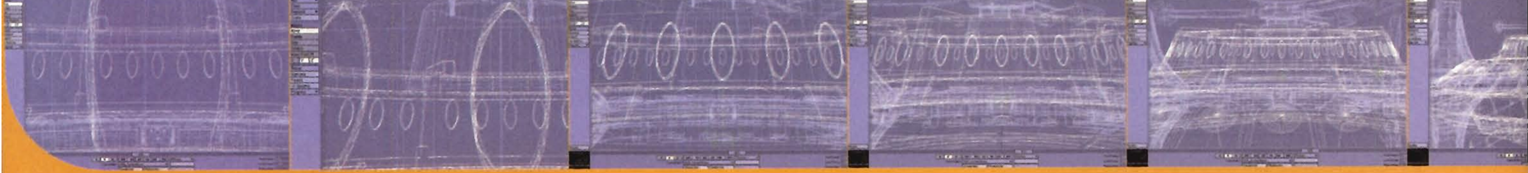
CTI-36RS	36.4 GB Array with 4 Seagate Barracuda 9.1GB Ultra Wide drives (#ST39173W) and Single Channel SCSI card (28.2 MB/s sustained transfer rate)	**3229.00**
CTI-36RD	Same as above with Dual Channel SCSI card (39.9 MB/s sustained transfer rate)	**3757.00**
CTI-36R2S	Same as above with 2 Single Channel SCSI card (46.4 MB/s sustained transfer rate)	**3999.00**

2 Bay Tower Removable

CTI-18RS	18.2GB Array with 2 Seagate Barracuda 9 1GB Ultra Wide drives (#ST39173W) and Single Channel SCSI card (28 2 MB/s sustained transfer rate)	**2166.00**
CTI-18RSD	Same as above with Dual Channel SCSI card (39.9 MB/s sustained transfer rate)	**2687.00**
CTI-36RS	36.4GB Array with 2 Seagate Barracuda 18.2GB Ultra Wide drives (#ST118273W) and Single Channel SCSI card (28.2 MB/s sustained transfer rate)	**2999.00**
CTI-36RSD	Same as above with Dual Channel SCSI card (39.9 MB/s sustained transfer rate)	**3485.00**

4 Bay Tower Removable

CTI-72RS	72.8 GB Array with 4 Seagate Barracuda 18.2 GB Ultra Wide drives (#ST118273W) and Single Channel SCSI card (28 2 MB/s sustained transfer rate)	**4809.00**
CTI-72RD	Same as above with Dual Channel SCSI card (39.9 MB/s sustained transfer rate)	**5289.00**
CTI-72R2S	Same as above with 2 Single Channel SCSI card (46.4 MB/s sustained transfer rate)	**5499.00**



"It's the swan song shot," said Meni Tsirbas. In the last shot of the last show of the last season of *Star Trek: Deep Space Nine*, Kira joins Jake on the promenade and then the camera wistfully pulls back out the window. The audience is granted one last lingering look at the station as the camera continues to pull back until Deep Space Nine becomes another celestial body in the *Star Trek* universe.

LEFT BEHIND ON DEEP SPACE NINE: A LIGHTWAVE MODEL

The Making of What You Leave Behind

by Dick De Jong and Molly Dinkins

From Practical to Digital

"There's a great deal of irony in that final shot because it shows a digital Deep Space Nine station for the first time," Tsirbas noted. Throughout the series, all the exterior shots of the station had been done using a practical model. But since the motion control rig could not pull back far enough to achieve the final 'point of light' effect, "they decided to go with digital," Tsirbas added. "It was great because I had built a LightWave DS9 model and I thought no one was ever going to see it because the show was coming to an end."

Into Dry Dock

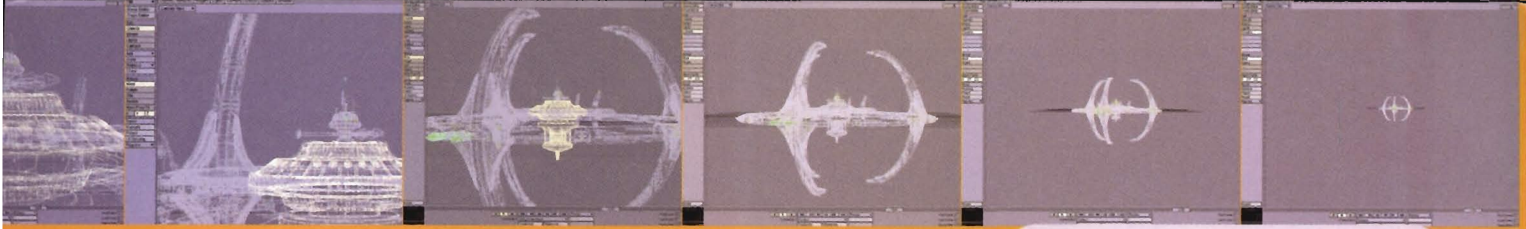
In 1995, Tsirbas, a Canadian, was recruited by Amblin Imaging. "It took a while for my work visa to clear. While I was waiting, I thought I would create the model of the DS9 station because I thought 'this is what needs to be done next.' I bought the model kit and several books which had pictures of the model and several blueprints of it. I also recorded the show and put it on my PVR and played the title sequence over and over again. Through all these references, I was able to come up with a model. Unfortunately, every reference was different."

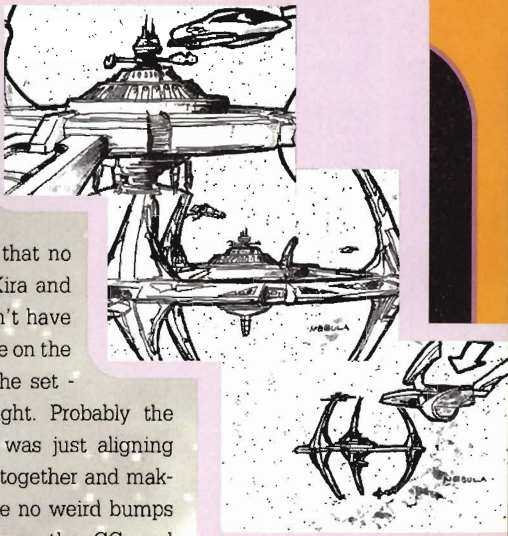
By the time Tsirbas made it to Hollywood, Amblin was breaking up. So, he decided to go to Digital Domain because they were working on a small film called *Titanic*. For the time being, he parked the CG model in dry dock. "I rendered out the Deep Space Nine station and used it as my desktop backdrop at Digital Domain," Tsirbas said.

Out of Dry Dock

Three years later, David Stipes, Star Trek Visual Effects Supervisor, who had heard rumors about the model, called about the closing shot for *What You Leave Behind*. Tsirbas, who was now an FX Supervisor at Station X, was delighted to resurrect his model. "We used the geometry I had done - which actually held up rather well - as a basis to put more detail over," he described. "I modeled mostly nurnies - which are minute, little details - and some extra things I missed the first time out."

"The model itself took several man weeks to finesse" Tsirbas said. He worked on it with Enrique Munoz and David Jones at Station X. "There was a lot more refined work to do on it and a lot of texture mapping. We ended up painting the textures from scratch. One of the things about the Deep Space Nine station is that it repeats. There are basically three sections, which are identical, and in each of those sections there's a mirrored image as well. So for a lot of the station, we only had to build one twelfth of it. There were some areas in the center that we had to build fully. The model itself is made up of about a dozen LightWave objects parented together. For all the pieces, it ended up being about a half million polygons - a little larger than the CG model of Voyager."





A Detailed Touch

"I've been following *Star Trek* for a long time, as far as effects go, and I'm really into Federation design and the specifics of it. I just like that kind of stuff because I'm a big geek," Tsirbas admitted. "Even with that, there were a lot of things I learned on this project about how very specific *Star Trek* design is. In this case, it was the shot design. We went through dozens of iterations of how the camera would pull back. Would there be any parallax in the stars? (In the *Star Trek* universe, no.) Even with all those specifications, I was able to be fairly creative with the shot. I threw in a nebula, which was just painted from scratch. I put detail that wasn't there on DS9. Up close there's some extra panels, some extra lights lighting up the first section that you see. There's a runabout landing pad that I detailed. They liked all those details."

A Little Push and Pull

"Pull-backs and push-ins have historically been done in *Star Trek* to begin and end series," Tsirbas described. "For *The Cage*, the pilot of *Star Trek*, the original series, the very first shot was this rather shaky shot of the Enterprise flying through space and there's a hole (which there shouldn't be) on top of the bridge and the camera flew all the way in."

In *The Next Generation*, for the last shot of *All Good Things*, the crew was playing cards and the camera pulled back on the table looking down, a bird's eye view. It dissolved to the hull of the Enterprise on the saucer and the camera kept pulling back. I remember David Stipes saying, he wanted to pull the shot through a window but there was no way they could do that. So instead they opted to dissolve from live action to miniature photography."

Because this final *Deep Space Nine* shot was so important, the approval went up all the way up the chain of command. "They wanted to make sure it was perfect," Tsirbas said. "It felt more like a movie shot, not a TV shot, because we made sure everything was dead on.

"The shot itself is a pull-back shot. Unfortunately, there wasn't any space behind the window to move the camera, so the camera person did a slow steady zoom out. The idea was to blend it from a zoom out to a pull-back as smoothly as possible. As it turned out, the zoom was way too slow which meant that we had to map the plate of Kira and Jake on a LightWave polygon and zoom it out faster. The only problem was that when we did that there was no more footage at the top and bottom of the frame. I had to create a composited pen and tile image and track it into the moving footage to do a set extension."

Many Parts of the Whole

"The DS9 station was rendered as a separate element. The window that they look out of was rendered with an alpha channel so that we could composite in the live action. Then immediately to the left and right of the window, there were more very large windows wrapping around the promenade section of the model. So I took photographic references of the promenade set when I was there. I created digital set extensions, which were strategically mapped on polygons within the windows and positioned to match the live action."

"We also asked that no one walk behind Kira and Jake so we wouldn't have to put digital people on the extended part of the set - to the left and right. Probably the biggest challenge was just aligning all those elements together and making sure there were no weird bumps and shakes between the CG and live action."

"The DS9 station was rendered just like the way the motion control model would be shot. In other words, we rendered a beauty pass, a fill pass, a light pass, a glow pass, and a dingy pass (the glowing red rod underneath the station). We gave them all these different elements because then they would have total control over how they were composited. Initially, we were going to try to do this all in-camera in just one pass; but David Stipes felt he needed more control over the contrast ratio - and he was right."

That's Not Obsessive

"To tell you how specific Star Trek is, when I delivered the shot, everything was fine. Then David Stipes called me and said the blinking sequence was wrong. There are these little blinking lights on top of a lot of the peaks on the station; and there's a specific frame interval to these blinkies. Someone like David Stipes could pick that up immediately because he knows the station so well. You need to get it exactly right. That's not obsessive, that's *Star Trek*."

Future Media Concepts

AUTHORIZED DIGITAL MEDIA TRAINING FOR

AVID
Media Composer

DIGIDESIGN
Pro Tools

ADOBE
After Effects
Illustrator
Photoshop
Premiere

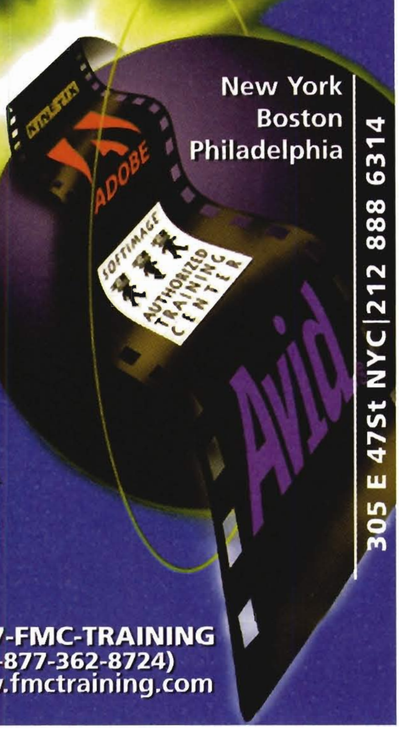
SOFTIMAGE
Softimage|3D
Softimage|DS

NEWTEK
Lightwave 3D

KINETIX
3D Studio MAX

MACROMEDIA
Director
Flash

WEB DESIGN



New York
Boston
Philadelphia

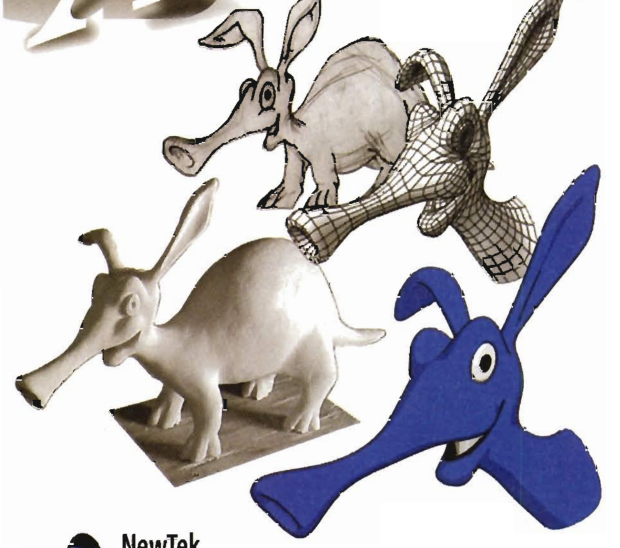
305 E 47St NYC|212 888 6314

1-877-FMC-TRAINING
(1-877-362-8724)
www.fmctraining.com

Web #309

3XD

Animation Training



NewTek
AUTHORIZED
TRAINING
CENTER

3D Exchange

3D Animation, Modeling, and Effects Training

New Classes • Bigger Facility • Better Location

www.3dexchange.com . (510) 747-1540

Web #310

You're *Open* for Business on the Web

Web Marketing
APPLIED
by Joe Tracy
Web marketing strategies for the new millennium!
Coming in December
Read This Book!

$31.95
Item#DMGB100
Over 300 Pages
Soft Cover

Written by internet specialist and leading author, Joe Tracy

...What's Your Next Move?

Web Marketing Applied, Web Marketing Strategies for the New Millennium, is the must-have book for Webmasters, Web marketers, Web developers...or anyone involved in the marketing or promotion of a Website. Every chapter is filled with powerful ideas to help you drive traffic to your site. Excellent for any industry, business or profession.

Master Your Next Move with Success!

Call 1-800-598-6008

Fax: 218-723-9146 • Outside the U.S. call 218-723-9180

Please mention code 950918NT when ordering

Visit our Website and order online at
www.advanstarbooks.com/webmarketing/

NewTekNIQUES

Say You Saw It In

T.S. Computers
& Video

818-760-4445 www.vgn.com

11300 Hartland Street North Hollywood CA 91605

PINNACLE SYSTEMS

NewTek

eyeon SOFTWARE INC.

LIGHTWAVE 3D

T.S. Computers has been helping video professionals and animators for over 15 years. As a full-service dealer, we will provide you with the tools you need to get the job done!

AURA

FRAME FACTORY

Toaster NT

FLYER

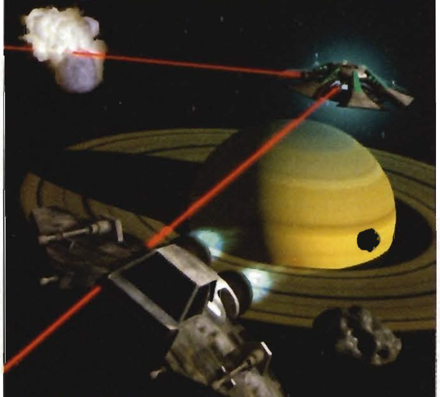
PERCEPTION VIDEO RECORDER

AMIGA

Internet Services

Web #311

Product information is available through the InfoTek service on www.newtekniques.com



Space Wars
Digital Effects Kit

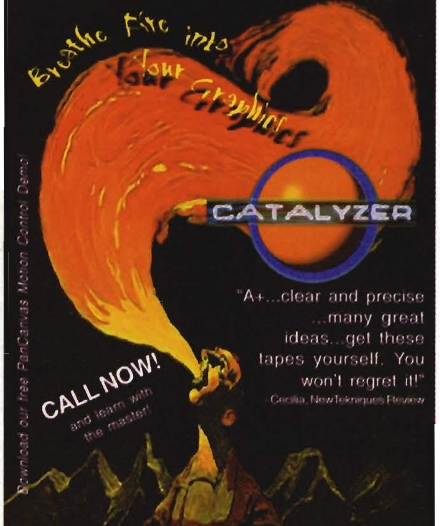
- 3D Models
- Explosions & Fire Sequences
- Textures & Backgrounds
- Sound Effects

It's not just an object collection, It's a 3D Effects SOLUTION!

Only **$129**

Digital Soundstage
P.O. Box 86824 Tucson, AZ 85754
(520) 743-2900
www.digitalsoundstage.com

Web #312



Breathe Fire into Your Graphics

CALL NOW! and learn with the master!
Download our free PanCanvas Motion Control Demo

Amazing
ImageFX
tutorial videos!

"A+...clear and precise ...many great ideas...get these tapes yourself. You won't regret it!"
- Cecilia, NewTekniques Review

Toastmaster columnist Bohus Blahut leads you step-by-step through show-stopping projects! You will apply these techniques to your creative work over and over. Each Catalyzer video includes floppy!

Volume 3: Layers & Stuff - Master layers, Cinemorph, scanning, printing, more! *Only $49.95*

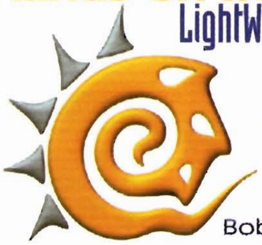
Vol.2: "Compositing" Alpha channels, rotoscoping, green screens, cool modes! *Only $39.95*

Volume 1: Animate lightning and other effects, do text tricks, master AutoFX and IMP! *Only $39.95*

ORDER TODAY! (773)465-5158 - Visa, MC accepted.
Send checks or MOs payable to Legacy Maker, Inc., PO Box 60711, Chicago, IL 60660. Shipping and handling is $5.95 for up to two items; $1 each add'l item. IL residents add 8.5% tax.

www.LegacyMakerInc.com

Web #313



Hands-on Training
LightWave 3D 6

NewTek
Authorized
Training
taught by
Bob Anderson

Las Vegas - February 16-24
Photorealism Series

Dallas - March 9-20
Character Animation Series

Chicago - March 29 - April 6
Photorealism Series

Topeka - Budget Workshops
May 16 - June 2
Our entire curriculum in 18 intensive days at bargain prices!

Philadelphia - June 5-16
Character Animation Series

Phoenix - July 10-21
Character Animation Series

Columbus, Ohio - August 2-10
Photorealism Series

Topeka - Budget Week
September 8-17
Character Animation Series

Salt Lake City - October 11-22
Character Animation Series

Atlanta - November 8-16
Photorealism Series

Photorealism Series

- LightWave 3D Essentials (3 days)
- Lighting/Camera Techniques (2 days)
- Surfacing Techniques (2 days)
- Compositing Techniques (2 days)

Character Animation Series

- LightWave 3D Essentials (3 days)
- Advanced LW 3D Techniques (3 days)
- Organic Modeling & Character Animation Essentials (2 days)
- Intermediate Organic Modeling & Character Animation (2 days)
- Advanced Character Animation: New L[6] Tools (2 days)

Washburn University
Division of Continuing Education

1700 SW College
Topeka, KS, USA 66621
lightwave@washburn.edu

785-231-1010, ext.1399
FAX: 785-231-1028

www.washburn.edu/ce/newtek

Web #314

AMITRACE
COMPUTER SYSTEMS
www.acsvideo.com

Authorized dealer for Trinity,
Newtek, Applied Magic,
Media 100 and InfoChannel

Authorized dealer for all NewTek products!

SEMINAR
December 9th & 10th

Call now to reserve seating for our free **Video Toaster NT seminar** being held on **December 9th and 10th at 10:30am and 2:30pm.** Ralph Messana from NewTek will be putting on the show! We will be offering special discounts and additional training to attendees who purchase a system at the show. Our Video Toaster NT workstations come pre-configured with all software and hardware options installed and ready to run.

Trinity, Video Toaster NT and Screenplay systems are always available for demo. In business since 1987, ACS Video is your one stop shop for all digital video hardware, related accessories and service. We specialize in Amiga and Video Toaster repairs and upgrades. We keep all parts in stock for fast turnaround.

5344 Jimmy Carter Blvd.
Norcross, GA 30093
(770) 263-9190 1-800-962-4489
Fax: 770-263-7852 www.acsvideo.com

Web #315

For those of you who missed the first desktop video revolution...

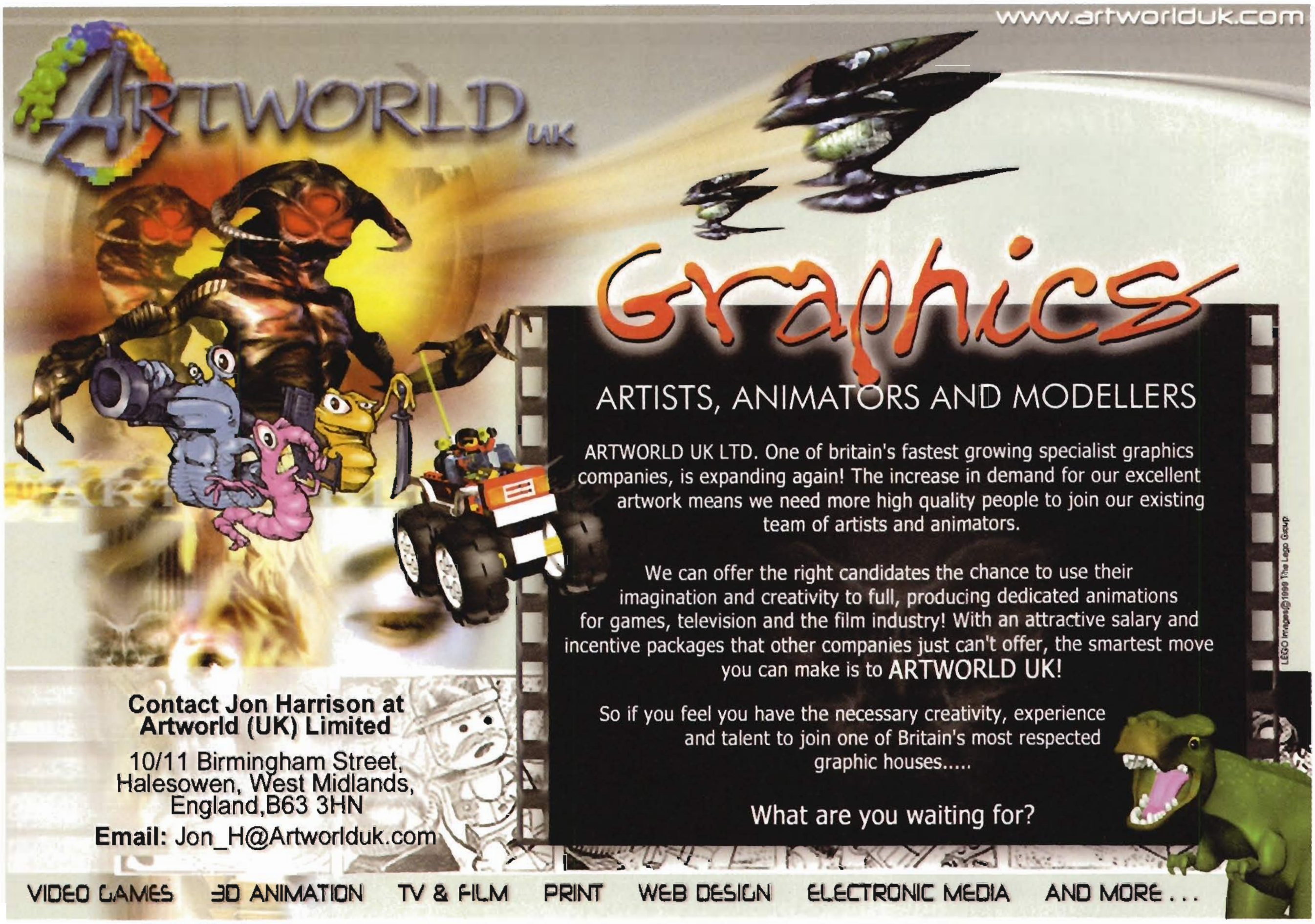
NewTek
IBM

...witness the second coming.
Video Toaster NT.

VideoLink Inc.
animation canada
Digital Video & Animation
Tel: 1.416.690.1690 Toll Free: 1-800-567-8481
Internet: www.videolink.ca

Web #316

Product information is available through the InfoTek service on **www.newtekniques.com**



ARTISTS, ANIMATORS AND MODELLERS

ARTWORLD UK LTD. One of britain's fastest growing specialist graphics companies, is expanding again! The increase in demand for our excellent artwork means we need more high quality people to join our existing team of artists and animators.

We can offer the right candidates the chance to use their imagination and creativity to full, producing dedicated animations for games, television and the film industry! With an attractive salary and incentive packages that other companies just can't offer, the smartest move you can make is to ARTWORLD UK!

So if you feel you have the necessary creativity, experience and talent to join one of Britain's most respected graphic houses.....

What are you waiting for?

Contact Jon Harrison at
Artworld (UK) Limited
10/11 Birmingham Street,
Halesowen, West Midlands,
England,B63 3HN
Email: Jon_H@Artworlduk.com

Web #317

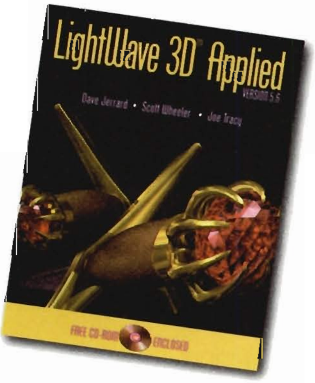
LightWave 3D™
Applied *Version 5.6*

Written by industry-leading authors
Dave Jerrard, Scott Wheeler and Joe Tracy

$49.95 with CD-ROM
Item #CADB700, Over 500 pages, softcover

Imagine a tutorial that has over 100 steps and more than 62 images, and that's just one chapter! The authars to LightWave 3D™ Applied, Version 5.6 understand that users learn best from step-by-step hands-on tutorials. With nine very detailed tutorial chapters, readers of LightWave 3D™ Applied, Version 5.6 will be able to build an entire medieval castle and onward to the Mercury Space Capsule. In addition, the authors have set up a specially designed web site that allows you access when you purchase the book to help answer any questions you may have.

With your purchase, you will receive a **FREE CD-ROM** containing materials featured in LightWave 3D™ Applied, Version 5.6 and extra objects, textures, and images.



Features Include:

- Nine step-by-step and hands-on tutorials.
- A special chapter for those who have never used LightWave 3D™ or Inspire 3D™ and want to get started.
- A special chapter on the secrets of a great demo tape and breaking into Hollywood as a LightWave 3D™ animator.
- A CD-ROM packed full of material from the book along with FREE bonus material!
- Insight from industry leading authors along with their tips and secrets to help you succeed.

Table of Contents:

Chapter 1: Beginner Techniques: LightWave 3D™ and Inspire 3D™ Basics
Chapter 2: Tutorial: Planet Earth
Chapter 3: Tutorial: Building a Castle, Part 1
Chapter 4: Tutorial: Building a Castle, Part 2
Chapter 5: Tutorial: The Fountain in the Courtyard
Chapter 6: Tutorial: The Sword in the Stone
Chapter 7: Tutorial: Catch a Wave
Chapter 8: Tutorial: The Mercury
Chapter 9: Tutorial: The Mercury Parachute
Chapter 10: Tutorial: Landing at Sea
Chapter 11: Insight: Breaking Into Hollywood

ORDER TODAY!
1-800-598-6008
Outside the U.S. 218-723-9180
Fax 218-723-9146

Visit our web site
www.advanstarbooks.com/lightwave/

Code: 950594r

LIGHTWAVE - ALL PLATFORMS
VIDEO & ANIMATION HQ
TOASTER/FLYER
Amiga Service Center

MONITORS - VIDEO - MULTIMEDIA
REPAIR - UPGRADES - NETWORKING

NEW!
A U R A

Special!
AURA BUNDLE
• AURA Plus 2 Video Tapes

THE LIVELY COMPUTER
8314 Parkway Dr.,
La Mesa, CA 91942
Voice:
(619) 589-9455
Fax:
(619) 589-5230
Email:
tlively@connectnet.com

Hardware & Software:
Newtek Direct Dealer
FRAME FACTORY/Aura/LW 5.6
Toaster/Flyer systems/upgrades
LightWave Plug-ins & tutorials
Networking Ariadne II, Hydra and INET 225/Miami Deluxe
Phase V - full line of *Amiga and Mac* products
OZWARE Flyer sw
Visual Inspirations Flyer sw
Nova Design ImageFX 3.2
Dimension Technology sw
Sony Tape Backup,

http://www.iworks.com/tlc/
NONLINEAR EDITING SYSTEMS

Web #319

19 CD's For Lightwave - Only $99.95 (Sales End April 1st U.S. Shipping is $15)

CD #1 - LIGHT-ROM GOLD, CD #2 - LIGHT-ROM 4, CD #3, 4, 5 - LIGHT-ROM 5, CD #6 - LIGHT-ROM 6, CD #7 - LIGHT-ROM 7, CD #8 - LIGHT-ROM 8, CD #9 - 3D ROM #1, CD #10 - 3DROM #2, CD #11 - Studio Meshkit, CD #12 - 3000 Jpeg Textures, CD #13,14 - L.E.N.Y. #1, CD #15 - L.E.N.Y. #2, CD #16,17,18,19 - Trigallery (All CD's Work With Windows)

L.E.N.Y. CD-ROM Lightwave Tutorials - only $25 each. L.E.N.Y. #1 - 2 CD-ROMs of Tutorials on Lightwave 3D. L.E.N.Y. #2 - Single CD of Character Animation Tutorials by Doug Kelly.

Free copy of LENY with any DinoROM, SurfacesROM or Photoreal Texture purchase.

DinosaursROM - $49.95 10 Dinosaur objects for Lightwave 3D with bones & IK.

520 Photoreal Seamless Textures - only $39.95 520 Seamless Textures of Buildings, Vehicles, Etc.

SurfacesROM - $49.95 300 Seamless Building Textures. Woods, Brick, Stone, Marble, Roofs, Etc.

www.lightrom.com ~ 1-800-265-4041 ~ 502-363-2986 (voice & fax)

LIGHT-ROM 8 All new collection of Lightwave 3D objects by artists around the world. Also includes over 2,000 Textures and 1,000 digital elevation maps for $39.95!

"Einstein" by Jamie Cope www.destinyimages.com

LIGHTROM 8 cover by Jim Curtis www.ncweb.com/biz/jmcgfx

"Opera" by Frank Maturi www.wilddog1.com/frank.htm

"Fairy" by Alex Lugones www.wildseed3d.com

"Frog" by Don Drennan http://home.sprynet.com/~ddrennan/home.htm

"Pufferfish" by www.burningham studios.com

Loren Sharp www.geocities.com/capecanaveral/hangar/6004

Graphic Detail Inc., 4556 South 3rd St., Louisville, Ky. 40214 USA ~ Mastercard & Visa accepted
Shipping is $4.95 for U.S., Canada & Mexico - $7.95 International ~ Bundle shipping is extra.
LIGHT-ROM is a trademark of Graphic Detail, all other trademarks are the properties of their respective owners.
Dealers, contact Graphic Detail for distribution info & pricing on any CD-ROM.

Web #320

FUTURE FANTASTIC

Genesis V2 PRO

The Ultimate Visual FX Plugin For Lightwave and Photoshop

Prepare to take your visual FX to the next level! Genesis V2 PRO delivers the most versatile and complete visual effects package ever, with infinite possibilities for creating stunning lens flares, glows, fire, smoke, explosions and much, much more. Genesis V2 PRO is a plugin available for Photoshop and Lightwave that comes with more than 200 special FX files that can be combined and used with your images and animations* to produce spectacular results. Not enough? Then create your own FX from scratch using the powerful set of tools provided in the new and improved interface.

Take a look at these features:

- Create effects by compositing an unlimited number of elements.
- Real time previews to provide visual feedback as you work.
- Huge variety of rendering, compositing and image displacement modes, including blurs, colourization effects, lighting and many more.
- Every variable that makes up an effect is editable.
- Advanced parametric fractal noise algorithms for the ultimate in organic effects.
- Powerful morphing controls to create multiple unique elements quickly.
- Animate all element parameters over time, including size, rotation, age, intensity, alpha channel and colourization of effects*

Whether you are thirsting to create amazing visual FX for film, television, games or the internet, Genesis V2 PRO will deliver stunning results with complete resolution independence and final rendering performed to the highest possible quality.

Genesis V2 PRO is the plugin you have been waiting for!

* *Animation feature only available in the Lightwave version*

Genesis V2 PRO
Before
After
Before
After

For a **FREE** evaluation version visit our website at: www.futurefantastic.com
Genesis V2 PRO is available through all good plugin resellers

Web #318

ADVERTISERS

COMPANY	PG#	RSN#
3D Exchange	44	310
ACS Computer	45	315
Artworld (UK)	46	317
B & H Photo Video	38-39	307
B & H Photo Video	40-41	308
Desktop Images	Cv.3	321
Digital Sound Stage	45	312
DVS Direct	29	304
Future Fantastic	47	318
Future Media Concepts	44	309
Graphic Detail	47	320
Legacy Maker Inc.	45	313
Lively Computers	46	319
N.A.B.	5	302
NewTek, Inc.	Cv.4	300
NewTek, Inc.	11	303
SafeHarbor Computers	33	305
SafeHarbor Computers	34-35	306
Station X Studios	Cv.2	301
T S Computers	44	311
Videolink, Inc.	45	316
Washburn University	45	314

Product information is available through the InfoTek service on www.newtekniques.com

MOJO

MUSINGS FROM OUR ACE LIGHTWAVE ANIMATOR

There's always a second chance... and a third and a fourth

by Mojo

NEVER SAY NEVER

Last year at exactly this time, I wrote a column about my big night at the Emmy Awards. The *Star Trek: Voyager* episode, *The Year of Hell - Part II*, had been nominated for Outstanding Special Visual Effects and, along with several of my comrades from Foundation, I sat and waited for The Announcement.

To be honest, I thought we had a pretty good chance of winning. I honestly felt the competition wasn't up to par.

Twice before that, I had also felt cheated out of an Emmy.

When the pilot film of *Babylon 5* won back in 1993, I thought I should have gotten one; Ron Thornton, Paul Bryant and the producer got one - why didn't I? After Ron, I did the majority of the remaining animation; I worked long hours and weekends and had to guess my way through uncharted waters along with everyone else - why didn't I qualify too? So what if it was my first job in the business? I earned it! To this day, I have never told Ron that I was even the slightest bit resentful (after all, the guy did give me my big break); but, there was always that tiny bit of concern in the back of my mind - what if I never get another chance?

The first and second season of *Babylon 5* provided other opportunities. Each year, we would submit the episodes that we thought contained our best work, in the hopes that it might win the gold - but to no avail. Sometimes you work on an episode that is of such epic proportions you know it is at least worthy of consideration - and that had yet to happen. Until year three!

The episode *Severed Dreams* (in which Earth Alliance forces try to take Babylon 5 by force) was that kind of show. It was huge, it was epic, and it had more effects shots than half the season combined! It was easily our best work to date and I had personally never felt more proud of anything in my life. Yes, this was the one that had Emmy written all over it - this was finally my big chance. So, months later, when it was about that time of year, I marched into Ron's office and asked him when the shows would be submitted for consideration. "Oh, the deadline's already past," he said. WHAT?!

I listened in horror as he explained the complicated political problems that prevented anything from being submitted that year (many of which led to Foundation and Babylon 5 parting ways in season four). I was stunned. After all that work and all that effort, to be denied during our finest hour - that was a hard pill to swallow. When I saw what won that year I was even more distressed because I was convinced our show would have beaten it - I still think so. Again, my mind was filled with thoughts of dread and hopelessness - I was cheated out of an Emmy for my best work - what if I never have another chance?

So there we sat on August 28th, 1999, ready to be dealt another card from the hand of fate, in another game of Hollywood Poker. This time, however, I had decided there was really no more point in crossing my fingers and calculating who had the best chances of winning. This year I was there to have fun, get dressed up, impress my date, and get all the free booze I could drink with a free ride home. Besides, the competition was fierce and I was firmly convinced that another episode of *Star Trek* was going to win.

There are very few moments in my life where I can say I was shocked, surprised and overjoyed in a way that defies description. The last time it happened, is when Ron Thornton called me out of the blue to offer me a job as an animator on *Babylon 5*. Since words cannot do the moment justice, I leave you with a picture of the next time it happened:

Robert Bonchune, Mojo and John Teska in a state of the happiest disbelief they have ever known.

My thanks to Kerry, Donetta, Paul, Ron, and the entire staff at Foundation Imaging - there's no way it would have happened without all of you.

Mojo is an Emmy awarded Supervising VFX Animator at Foundation Imaging. You can email him at mojo@foundation-i.com www.newtekniques.com

10 Reasons to Subscribe to NewTekniques Today!

1. Content

NewTekniques delivers more information, tips, news and tutorials relating to NewTek products than any other publication.

2. Knowledge

NewTekniques has the top Hollywood FX artists and industry leaders sharing with you the same information that got them to Hollywood!

3. Insight

NewTekniques dissects some of LightWave's top Hollywood FX shots so that you know how the shots are achieved.

4. Simplicity

Tutorials in ***NewTekniques*** are presented in an easy to follow step-by-step process, making it easier for you to accomplish the end goal.

5. Support

NewTekniques is actively involved in supporting the NewTek user community and every reader. One of the ways this is accomplished is through the huge ***NewTekniques*** Web site and ***NewTekniques*** Mailing List.

www.newtekniques.com

6. Vision

NewTekniques can help give you a vision that will help take you and your work to the next level. Top Hollywood FX artists, give you important advice.

7. Design

NewTekniques invests strongly in layout design to make your reading more enjoyable.

8. Dedication

NewTekniques is not only dedicated to every reader, but the staff of ***NewTekniques*** are active participants in the various LightWave and Toaster forums.

9. Spirit

NewTekniques is a strong part of the NewTek community and spirit that surrounds it. All the columnists and staff interact regularly with readers out of a genuine desire to be helpful.

10. Reliability

NewTekniques has never missed a shipping date and is consistently delivered on time.

"If you are going to buy one magazine to help you up the learning curve of 3D Design and animation, this is the magazine (NewTekniques) to buy."

— 3D Interactive.

Hear from industry experts, meet some new ones, and maybe even *become* one...with NEWTEKNIQUES magazine. From news and information to tutorials and insider tips, NEWTEKNIQUES will enhance your expertise and spark your imagination! Subscribe right now!

SUBSCRIPTION CARD

NewTekniques

131 W 1st St., Duluth, MN 55802-2065
Phone: 218-723-9477 • Fax: 218-723-9417

○ **YES! Begin my NewTekniques subscription immediately!**
○ **no**

U.S. & POSSESSIONS	$32.00
CANADA & MEXICO	$42.00
ALL OTHER COUNTRIES	$58.00

Payable in U.S. funds drawn on a U.S. bank

○ Bill Me
○ Charge my subscription to:
○ VISA ○ MasterCard ○ American Express

Acct. # ______ Exp. Date ______
City ______
State ______ Zip ______

SIGNATURE ______ Date ______
Name (PLEASE PRINT) ______

Title ______
Company Name ______
E-Mail Address ______
Address ______
City ______
State ______ Zip ______
Phone (___) ______
Fax (___) ______

Start Your Subscription Immediately!

Fax your subscription card back to us at: **218-723-9417**

or

Subscribe on our website at: www.superfill.com/subscribe/ntek.htm

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST-CLASS MAIL PERMIT NO 665 DULUTH MN

POSTAGE WILL BE PAID BY ADDRESSEE

NewTekniques
131 W 1ST ST
DULUTH MN 55802-9882

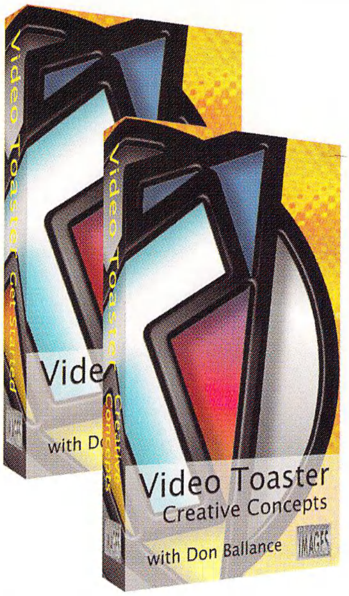
Please fold along perforation and tape at top

www.newtekniques.com

NewTekniques

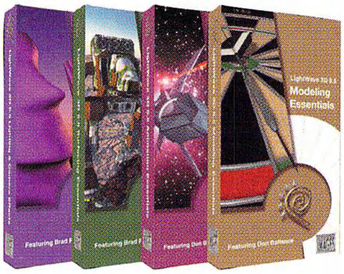
Video Training for Digital Editing, 3D Animation and Special Effects

Train Your Brain

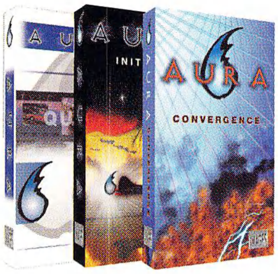

Video Toaster
Creative Concepts
with Don Ballance
IMAGES

The New Video Toaster

Get up to speed fast with this complete video training series. Learn to optimize configuration settings, Editing Techniques, Compositing Tips, Animation & Special Effects. Discover how to maximize your abilities with this new "beyond broadcast quality" digital video creation system.


LightWave 3D 5.6
Modeling Essentials

LightWave VT

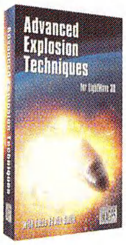

AURA
CONVERGENCE

Aura VT

Complete series only $349.95 or $49.95 each +S&H

Advanced Explosion Techniques

with Emile Edwin Smith


Advanced Explosion Techniques
for LightWave 3D

Foundation Imaging's Emile Edwin Smith demonstrates techniques for creating realistic explosion sequences in LightWave 3D. Learn how to take any model and place it in an action packed explosion sequence complete with flames, sparks, shattering windows, burning understructure & flying debris

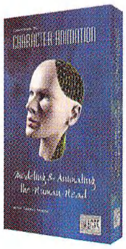
$49.95 +S&H

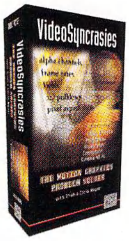
Modeling + Animating the Human Head

with Tareq Mirza

Learn the techniques used in creating models for the Starship Troopers animated series! Tareq Mirza provides step-by-step instruction for modeling, creating phoneme targets & applying facial animation. A systematic approach that provides the basis for creating virtually any head, real or imaginary!

$49.95 +S&H

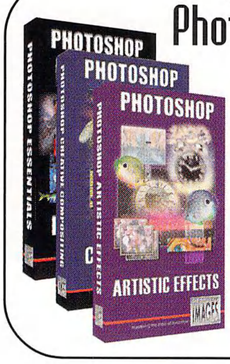

CHARACTER ANIMATION
Modeling & Animating the Human Head


VideoSyncrasies
The Motion Graphics Problem Solver

Videosyncrasies The Motion Graphic Problem Solver

Motion graphic experts Chris & Trish Meyer provide the answers to key issues that can make or break an animation. Learn the fundamental concepts of alpha channels, frame rates & film transfer pull down. Manage fields to reduce rotoscope & masking work. Understand the primary issues with rendering variables, non-square pixels and avoiding image quality "gotchas". Essential concepts for beginner through advanced level artists, designers, video editors, compositors and 3D animators alike. It's the Money Tape!

Two tape set only $79.95 +S&H


PHOTOSHOP
PHOTOSHOP
PHOTOSHOP
ARTISTIC EFFECTS
IMAGES

Photoshop Artistic Effects

with Katrin Eismann

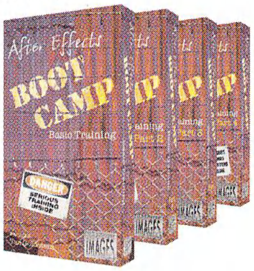
Think you know Adobe Photoshop? Well think again. Enhance your creative skills with advanced layering techniques & special effects. Discover powerful image enhancement capabilities. Master the History Palette & History Brush features. Learn quick navigation techniques & color management features for consistent image quality every time!

Complete series only $149.95
or $49.95 each +S&H

After Effects Boot Camp

featuring Taz Goldstein

Discover the powerful features of Adobe After Effects 4.x through hands-on exercises and in-depth exploration. Learn techniques for creating layered compositions and motion graphic animation for broadcast video, special effects & multimedia design. Taz combines his professional expertise with a unique blend of humor that makes learning fast & easy.


After Effects
BOOT CAMP
Basic Training
DANGER
IMAGES

Complete series only $179.95 or $49.95 each +S&H

Call Toll Free

1-800-377-1039

On-Line Order Catalog

www.desktopimages.com

DESKTOP IMAGES™

Desktop Images 1805 W. Magnolia Blvd. Burbank, CA 91506, 818-841-8980 fax 818-841-8023 email - sales@desktopimages.com
S&H add **$4.95** for first tape plus **$1.50 each additional tape.** CA residents add sales tax. For PAL format add $5.00 per tape.

N1299

Web # 321

COMPRESSION
Sucks
The New
Video Toaster®

Save $1000

Registered owners of the Amiga Video Toaster and/or LightWave will receive a $1000 discount off the new Video Toaster through 12/31/99.

Web # 300

www.videotoaster.com
Call **(800) Toaster**
Outside the U.S. call (210) 370-8000

NewTek